JULY 1954

VOLUME 3, NUMBER 7

Battelle Technical Review

IN THIS ISSUE:

Semiconductors and Their Applications

STRESS ANALYIST--METALLURGIST

ROBERT L. CARLSON

In the 19th Century, engineers dealt with "uncomplicated" materials whose properties were seldom seriously taxed. In evaluating these materials, it was enough to consider them as having simple properties that obeyed a few well-understood laws. Today, we have a rapidly growing armory of intricately compounded materials whose properties are often difficult to assess. Moreover, modern materials are likely to be taxed to their limits by high temperatures, tremendous stresses, or excessive usage. This calls for a highly realistic approach in studying the behavior of metals—an approach combining consideration of their internal structures with a study of their response to applied forces and conditions.

Robert L. Carlson is one of a small group that is attacking the problem of materials evaluation by this approach. Since joining Battelle in 1950, his investigations have centered largely on metals.

Much of Bob's time has been spent in studying the creep buckling of columns of aluminum and other metals. He has investigated the high-temperature stress rupture of alloys; the effect of stress, temperature, and surface preparation on the strength of metals; the effect of size and stress state on the fracture of brittle materials; and the effects of high temperatures on the strength of metal joints; and has made force analyses of parts while in operation at the mill to determine better methods of fabricating them.

Bob's original training for this work was gained at Purdue University. He received his bachelor degree in mechanical engineering there in 1948. Two years later he received his master's degree in engineering mechanics. Armed with a good background in mathematics, he has helped establish Institute research in the twilight zone between materials engineering and the physics of materials.

Away from the Institute, Bob's time is largely taken by his two children, one just newly arrived. He sometimes gets a few minutes to enjoy his fine collection of classical records.

BATTELLE TECHNICAL REVIEW ABSTRACTS

ABSTRACT INDEX

Aeronautical Engineering 417a

Agriculture 419a

Biochemical and Biophysical Research 421a

Ceramics and Concrete 422a

Chemical Engineering 425a

Chemistry—Analytical and Inorganic 426a

Chemistry—Organic 428a

Chemistry—Physical 430a

Coatings 432a

Corrosion 435a

Electrical Engineering 436a

Electrochemistry and Electroprocesses 438a

Electronics 439a

Engineering Economics 441a

Fluid Mechanics 444a

Food Technology 444a

Fuels and Combustion 445a

Geology and Mineralogy 447a

Geophysics 448a

Graphic Arts 448a

Heat Power 449a

Information—Preparation and Dissemination 449a

ABSTRACT INDEX (Continued)

INSTRUMENTATION AND LABORATORY APPARATUS 450a

LUBRICATION AND FRICTION 451a

MECHANICAL ENGINEERING 453a

METALLURGY 454a

METALS—EXTRACTION AND REFINING 456a

METALS—FINISHING, POLISHING, AND CLEANING 459a

METALS—FOUNDRY PRACTICE 460a

METALS—HEAT TREATMENT 461a

METALS—MECHANICAL AND PHYSICAL PROPERTIES 462a

METALS—MECHANICAL WORKING 468a

METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES 470a

METALS—POWDER 474a

MINING ENGINEERING 474a

NONDESTRUCTIVE TESTING 475a

NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION 476a

OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING 477a

ORE AND MATERIALS BENEFICIATION 478a

PHYSICS 479a

PLASTICS 480a

POLLUTION AND WASTES 482a

RUBBER AND ELASTOMERS 483a

SPACE HEATING AND CONDITIONING 483a

TEXTILES AND FIBERS 484a

WELDING AND JOINING 485a

WOOD AND FOREST PRODUCTS 487a

BATTELLE TECHNICAL REVIEW ABSTRACTS

Volume 3, Number 7 July 1954

***Asterisks mark items that may be used in the Battelle Library only. None of the unbound materials listed below are available for interlibrary loan.**

AERONAUTICAL ENGINEERING

9049* The Domain of the Helicopter. Raoul Hafner. *Aeroplane*, v. 86, Mar. 19, 1954, p. 334-337.

Present trends and future designs. Photographs, graphs, diagrams.

9050 Theoretical Formulation of Cabin Temperature Control. E. J. Gabbay. *Aircraft Engineering*, v. 26, Mar. 1954, p. 64-69.

Simplified system approximates that of single-seater aircraft. Diagrams. 3 ref.

9051 The Elementary Theory of Aero-Elasticity. I. Divergence and Reversal of Control. E. G. Broadbent. *Aircraft Engineering*, v. 26, Mar. 1954, p. 70-79.

Elastic and aerodynamic stiffness mathematically presented. Diagrams.

9052 Rotor Blade Motion in a Vertical Sharp-Edged Gust. III. Forward Flight. P. R. Payne. *Aircraft Engineering*, v. 26, Mar. 1954, p. 80-83.

Dynamics of helicopter blade flapping, with method of deriving maximum gust deflexion. Graphs.

9053 The Problem of Thermal Stresses in Aircraft Structures. E. Loveless and A. C. Boswell. *Aircraft Engineering*, v. 26, Apr. 1954, p. 122-124.

Various heat sources and sinks. Temperature effects on metals used. Graphs, diagrams.

9054* Fundamentals of Space Navigation. Derek F. Lawden. *British Interplanetary Society, Journal*, v. 13, Mar. 1954, p. 87-101.

Conditions to be satisfied by a rocket trajectory connecting terminal points, for minimum fuel expenditure, are given for general case of an arbitrary gravitational field. 2 ref.

9055 Energy Approach to the General Aircraft Performance Problem. Edward S. Rutowski. *Journal of the Aeronautical Sciences*, v. 21, Mar. 1954, p. 187-195.

Performance is considered from point of view of balance that must exist between potential and kinetic energy change of aircraft, energy dissipated against drag, and energy derived from fuel. Graphs. 3 ref.

9056 The Flow Over a Flat Plate With a Small Angle of Attack at Mach Number 1. Gottfried Guderley. *Journal of the Aeronautical Sciences*, v. 21, Apr. 1954, p. 261-274.

Includes diagrams, graphs. 9 ref.

9057 Torsional Strength and Stiffness Tests of Wing Leading Edges. J. F. Besseling and W. K. G. Floor. *Netherlands National Luchtvaartlaboratorium Report* S.421, June 1953, 42 p. + 2 plates. (TL526.N3 N38.5r)

Torsion tests on 36 wing leading edges stiffened only by full-web ribs. Tables, graphs, photographs, diagrams. 6 ref.

9058 Density of Extensive Air Showers at Airplane Altitudes. Henry L. Kraybill. *Physical Review*, v. 93, ser. 2, Mar. 15, 1954, p. 1360-1361.

Knowledge of density spectrum at airplane altitudes helps check theories of origin and development. Diagram, table, graph. 4 ref.

9059* On the Transformation of the Linearized Equation of Unsteady Supersonic Flow. John W. Miles. *Quarterly of Applied Mathematics*, v. 12, Apr. 1954, p. 1-12.

Equation for supersonic flow is transformed from classical wave equation to canonical form, by a modified Lorentz transformation. 35 ref.

9060* The Effect of Heat Transfer on the Separation of a Compressible Laminar Boundary Layer. C. R. Illingworth. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 7, Mar. 1954, p. 8-34.

Problems of laminar boundary layers with non-uniform density due to large temperature differences or large Mach numbers. Tables, graph.

9061* Flight Simulators. G. B. Ringham and A. E. Cutler. *Royal Aeronautical Society, Journal*, v. 58, Mar. 1954, p. 153-170; disc., p. 170-172.

Development, application, advantages, and limitations. Photographs, tables, diagrams, graphs. 16 ref.

9062 A Study of Inviscid Flow About Airfoils at High Supersonic Speeds. A. J. Eggers, Jr., Clarence A. Syvertson, and Samuel Kraus. *U. S. National Advisory Committee for Aeronautics, Report* 1123, 1953, 27 p. (TL521 Un3r)

Shock-expansion method predicts flow about curved airfoils up to high Mach numbers, provided flow deflection angles are not too close to those corresponding to shock detachment. Tables, graphs. 23 ref.

9063 Some Effects of Frequency on the Conrtibution of a Vertical Tail to the Free Aerodynamic Damping of a Model Oscillating in Yaw. John D. Bird, Lewis R. Fisher, and Sadie M. Hubbard. *U. S. National Advisory Committee for Aeronautics, Report* 1130, 1953, 17 p. (TL521 Un3r)

Directional damping and stability were measured at Mach 0.14 and compared with damping and stability from effects of unsteady lift. Diagrams, graphs, photograph, table. 16 ref.

9064 Theoretical Supersonic Force and Moment Coefficients on a Side-slipping Vertical- and Horizontal-Tail Combination With Subsonic Leading Edges and Supersonic Trailing Edges. Frank S. Malvestuto, Jr. *U. S. National Advisory Committee for Aeronauitcs, Technical Note* 3071, Mar. 1954, 69 p. (TL570 Un3t)

Applies expressions for pressure distributions to other planform shapes of tail surfaces and possible wing-vertical-tail arrangements. Diagrams, graphs. 16 ref.

9065 A Preliminary Investigation of the Effects of Gusty Air on Helicopter-Blade Bending Moments. Joseph W. Jewel, Jr. and Paul J. Carpenter. *U. S. National Advisory Com-*

Aeronautical Engineering

mittee for Aeronautics, Technical Note 3074, Mar. 1954, 28 p. (TL570 Un3t)

Effects of gusts on rotor-blade bending moments are secondary when compared with vibratory moments from unsymmetrical rotor downwash when tested and analyzed at the 26-m.p.h. wind-velocity condition. Graphs, oscillograms, photographs. 3 ref.

9066 Measurement of Pressure and Temperature for Appraisal for the Temperature Method of Airspeed Calibration in the Lower Stratosphere. Lindsay J. Lina. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3075, Mar. 1954, 12 p. (TL570 Un3t)

Determines if temperature and pressure conditions in lower stratosphere meet requirements of temperature method for accurate calibration of airspeed installations. Graphs, photograph. 3 ref.

9067 The Zero-Lift Drag of a 60° Delta-Wing—Body Combination (Agard Model 2) Obtained From Free-Flight Tests Between Mach Numbers of 0.8 and 1.7. Robert O. Piland. *U. S. National Advisory Committee for Aeronautics, Technicol Note* 3081, Apr. 1954, 11 p. (TL570 Un3t)

Estimate drag of configuration by summing the estimates of drag of various components. Graphs, diagrams, tables. 6 ref.

9067a Theoretical Prediction of Pressure Distribution on Nonlifting Airfoils at High Subsonic Speeds. John R. Spreiter and Alberta Alksne. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3096, Mar. 1954, 84 p. (TL570 Un3t)

Solutions obtained by use of iteration process of an integral equation for transonic flow proposed by Oswatitsch. Graphs, photographs, diagrams. 38 ref.

9068 Turbulent Boundary-Layer and Skin-Friction Measurements in Axial Flow Cylinders at Mach Numbers Between 0.5 and 3.6. Dean R. Chapman and Robert H. Kester. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3097, Mar. 1954, 53 p. (TL570 Un3t)

Average skin-friction coefficients in absence of heat transfer for completely turbulent flow along cylindrical portion of cone-cylinder bodies of revolution having over-all fineness ratios of 10, 15, and 25. Tables, graphs, diagrams, photographs. 58 ref.

9069 Impingement of Water Droplets on an Ellipsoid With Fineness Ratio 5 in Axisymmetric Flow. Robert G. Dorsch, Rinaldo J. Brun, and John L. Gregg. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3099, Mar. 1954, 50 p. (TL570 Un3t)

Total rate, extent, distribution, and local rate of water impingement was determined. Table, diagram, graphs. 10 ref.

9070 Statistical Study of Transition-Point Fluctuations in Supersonic Flow. J. C. Evvard, M. Tucker, and W. C. Burgess, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3100, Mar. 1954, 32 p. (TL570 Un3t)

Random movement of transition point on a 10° cone at a free-stream Mach number 3.12 investigtaed by means of a large number of high-speed schlieren photographs. Photographs, graphs, diagrams, table. 16 ref.

9071 Cooling Requirement for Stability of Laminar Boundary Layer With Small Pressure Gradient at Supersonic Speeds. George M. Low. *U. S. Natinoal Advisory Committee for Aeronautics, Technical Note* 3103, Mar. 1954, 16 p. (TL570 Un3t)

Two-dimensional disturbances are treated in stability calculations. Graphs, table. 14 ref.

9072 Experimental Investigation of Sublimation of Ice at Subsonic and Supersonic Speeds and Its Relation to Heat Transfer. Willard D. Coles and Robert S. Ruggeri. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3104, Mar. 1954, 29 p. (TL570 Un3t)

Mass transfer by sublimation, heat transfer, and skin friction for an iced surface on a flat plate for Mach numbers of 0.4, 0.6, and 0.8 and pressure altitudes to 30,000 ft. Graphs, photograph, diagrams. 11 ref.

9073 Aerodynamics of Slender Wings and Wing-Body Combinations Having Swept Trailing Edges. Harold Mirels. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3105, Mar. 1954, 96 p. (TL570 Un3t)

Lift, roll, and pitch calculations, for highly swept wings. Graphs, diagrams. 21 ref.

9074 A Design Study of Leading-Edge Inlets for Unswept Wings. Robert E. Dannenberg. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3126, Mar. 1954, 56 p. (TL570 Un3t)

Determines profile coordinates of an airfoil from formulas which are dependent only on airfoil coordinates and on height of the opening. Diagrams, graphs, tables, photographs. 25 ref.

9075 The Effectiveness at High Subsonic Mach Numbers of a 20-Percent-Chord Plain Trailing-Edge Flap on the NACA 65-120 Airfoil Section. Louis S. Stivers, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3127, Mar. 1954, 15 p. (TL570 Un3t)

Plain trailing-edge flap employed on 10%-thick airfoil section at Mach numbers as high as 0.875 retains at least 50% of effectiveness exhibited at low Mach numbers. Graphs. 4 ref.

9076 Investigation of a Slat in Several Different Positions on an NACA 64A010 Air foil for a Wide Range of Subsonic Mach Numbers. John A. Axelson and George L. Stevens. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3129, Mar. 1954, 35 p. (TL570 Un3t)

For section lift coefficients up to 0.6, airfoil with slat retracted generally was aerodynamically superior to any other airfoil-slat arrangement. Graphs, photographs, diagram, tables. 6 ref.

9077 Experimental Determination of Thermal Conductivity of Low-Density Ice. Willard D. Coles. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3143, Mar. 1954, 12 p. (TL570 Un3t)

Investigates heat and mass transfer by sublimation for an iced surface on a flat plate in a high-velocity tangential air stream. Graphs, photograph, diagram. 7 ref.

9078 Note on the Aerodynamic Heating of an Oscillating Surface. Simon Ostrach. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3146, Apr. 1954, 12 p. (TL570 Un3t)

Analysis of temperature distributions in a fluid over an oscillating surface with heat transfer. Associated heat-transfer parameters compared with those for case of conduction at a stationary surface with same initial temperature potential. 6 ref.

9079 Effects of Subsonic Mach Number on the Forces and Pressure Distributions on Four NACA 64A-Series Airfoil Sections at Angles of Attack as High as 28°. Louis S. Stivers, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3162, Mar. 1954, 145 p. (TL570 Un3t)

Lift, drag, moment, and pressure-distribution measurements were made for NACA 64A010, 64A410, 64A006, and 64A406 airfoil sections. Photographs, graphs, tables. 13 ref.

9080 Thermal Conductance of Contacts in Aircraft Joints. Martin E. Barzelay, Kin Nee Tong, and George Hollo. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3167, Mar. 1954, 47 p. (TL570 Un3t)

Factors influencing thermal conductance across interface between Al alloy and stainless steel structural joints. Graphs, diagrams, tables, photographs. 9 ref.

9081 Ion Tracer Technique for Airspeed Measurement at Low Densities. W. B. Kunkel and L. Talbot. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3177, Mar. 1954, 31 p. (TL570 Un3t)

Aerodynamic and production-detection problems associated with ion tracer velocity measurement techniques. Particularly emphasizes those aspects unique to low-density gas dynamics. Graphs, diagrams. 8 ref.

See also:

9254 (heat transfer in boundary layers)
9613 (radio navigation)
9637 (shock wave drag)

9640 (flow through cascades of airfoils)
9716 (meterological services for aircraft)
9844 (hydraulic systems for aircraft)
10109 (fatigue tests on aircraft wings)

AGRICULTURE

9082* Radiotracers in Study of Systemic Insecticides. R. L. Metcalf. *Agricultural Chemicals*, v. 9, Mar. 1954, p. 33-35, 128-130.

Includes photographs, radioautographs. 8 ref.

9083* Results of 1953 Fungicide Tests. *Agricultural Chemicals*, v. 9, Mar. 1954, p. 57 + 5 pages.

Includes tables.

9084 Methods for Grain Moisture Measurement. Lawrence Zeleny. *Agricultural Engineering*, v. 35, Apr. 1954, p. 252-256.

Drying with desiccants; oven, distillation, and chemical drying methods based on relative humidity measurement; and electric moisture meters. Graphs. 20 ref.

9085* Problems of Scientific Soil Nutrition for Increased Crop Yields. (Russian.) T. D. Lysenko. *Agrobiologiia*, 1953, no. 5, Sept.-Oct., p. 17-31.

Use of artificial, natural, and mixed fertilizers on unproductive acid and alkaline soils. Table.

9086* Morphological Analysis of the Maize Ear. Norton H. Nickerson. *American Journal of Botany*, v. 41, Feb. 1954, p. 87-92.

Experimental study. Diagrams. 38 ref.

9087* Observations on Toxicity of Aldrin. II. Serum Esterase Changes in Rats Following Administration of Aldrin and Other Chlorinated Hydrocarbon Insecticides. M. Crevier, W. L. Ball, and Kingsley Kay. *Archives of Industrial Hygiene and Occupational Medicine*, v. 9, Apr. 1954, p. 306-314.

Includes graphs, tables. 17 ref.

9088* Investigations on Organic Fungicides. VIII. The Biochemical Mode of Action of Bisdithiocarbamates and Diisothiocyanates. (English.) A. Kaars Sijpesteyn and G. J. M. Van Der Kerk. *Biochemica et Biophysica Acta*, v. 13, no. 4, Apr. 1954, p. 545-552.

Includes graphs, table. 6 ref.

9089 Studies in Plant Mineral Nutrition. I. An Investigation Into the Cause of Gray Speck Disease of Oats. W. Leach, Ruth Bulman, and Johanna Kroeker. *Canadian Journal of Botany*, v. 32, Mar. 1954, p. 359-368.

Experiments over a period of three years in which plants of *Avena sativa* var. Tama grown in nutrient solutions provided variations in Fe, Mn, and Ca concentrations and pH. Tables. 15 ref.

9090 Studies of the Mechanism of Transmission of Potato Virus Y by the Green Peach Aphid, *Myzus Persicae* (Sulz.) (Homoptera: Aphidae). R. H. E. Bradley. *Canadian Journal of Zoology*, v. 32, Apr. 1954, p. 64-73.

Materials and general methods; time *M. persicae* remains infective; and acquisition of virus. Tables, graph. 15 ref.

9091 The Effect of Insecticides on the Action Potentials of Insect Nerve. D. I. V. Lalonde and A. W. A. Brown. *Canadian Journal of Zoology*, v. 32, Apr. 1954, p. 74-81 + 3 plates.

Solutions of 17 insecticides in corn oil were applied to leg of *Periplaneta americana* (L). Effects on sensory impulses of crural nerve were determined by means of preamplifier and cathode-ray oscillograph. Table, photographs. 9 ref.

9092 The Chemistry of Plant-Growth Regulators. I. 2:4-Dichloro-6-Hydroxyphenoxyacetic Acid and Related Compounds. G. W. K. Cavill and D. L. Ford. *Chemical Society, Journal*, 1954, Feb., p. 565-568.

Method of synthesis and lack of growth-regulating properties of these compounds in relation to current theories on mode of action of 2:4-D.

9093* The Fundamentals of Fertilizer Application. Firman E. Bear. *Crops & Soils*, v. 6, Mar. 1954, p. 9-12.

Reviews row and broadcast applications of solid and liquid types. Photographs.

9094* Gypsum Makes Wet Spots Drain. J. C. Reinhart. *Crops & Soils*, v. 6, Apr.-May, 1954, p. 16-17, 34.

Problems caused by excess water in soils minimized with gypsum. Photographs.

9095* Separation of Primary Products of Photosynthesis. (Russian.) N. G. Doman. *Doklady Akademii Nauk SSSR*, v. 93, no. 1, Nov. 1, 1953, p. 115-117 + 1 plate.

Products from bean plants separated by tagged-atom method. Photographs, table. 6 ref.

9096* Application of Bacterial Fertilizer AMB to Cultivation of Seedlings in Turf and Turf-Humus Pots. (Russian.) N. M. Lazarev and V. N. Kondrat'ev. *Doklady Vsesouznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk, Imeni V.I. Lenina*, v. 19, no. 1, 1954, p. 20-24.

Preparation and application of fertilizers containing microorganisms. Photographs, table.

9097* Influence of Azotobacter on Yield of Potatoes. (Russian.) F. F. Siderov. *Doklady Vsesouznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk, Imeni V.I. Lenina*, v. 19, no. 1, 1954, p. 25-27.

Superphosphate, K, and NH_4NO_3 fertilizers increased growth and yield. Tables.

9098* Irrigation of Vegetable Crops by Wetting the Root Level Alone. (Russian.) G. I. Feshchenko. *Doklady Vsesouznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk, Imeni V.I. Lenina*, v. 19, no. 1, 1954, p. 41-48.

Uses force pump, flexible hoses, and introduces organic matter along with water. Tables, graph, photographs.

9099 Soil From a Fallow Field Used as Bacterial Fertilizer. (Russian.) F. P. Krivykh. *Doklady Vsesouznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk, Imeni V.I. Lenina*, v. 19, no. 2, 1954, p. 16-20.

Microörganism activity was shown to be greater in fallow field than in cultivated plots. Inoculation of seeds with this soil considerably increased crop yields. Tables.

9100* New Developments in Agriculture. Antibiotics for Controlling Plant Diseases. New Form of Fertilizer. (Russian.) *Dostizheniia Nauki i Peredovogo Opyta v Sel'skom Khoziaistve*, 1954, no. 1, Jan., p. 72-75.

Application of by-product from potato starch factory as fertilizer. Tables.

9101* Chemical Control Measurse for Brushwood. (Russian.) A. I. Sokman. *Dostizheniia Nauki i Peredovogo Opyta v Sel'skom Khoziaistve*, 1954, no. 3, Mar., p. 83-85.

Effective, economical methods for spraying 2,4-dichlorophenoxyacetic acid (2,4-D) on undesirable scrub growths. Photograph.

9102* Investigation of Methods of Chemical Control of Weeds. (Russian.) *Dostizheniia Nauki i Peredovogo Opyta v Sel'skom Khoziaistve*, 1954, no. 3, Mar., p. 86-88.

Herbicides investigated were 2,4-dichlorophenoxy-acetic acid (2,4-D), methylchlorophenoxy-acetic acid (MCP), dinitro-o-cresol, and dinitro-o-phenol. Tables.

9103* The Control of Annual Grasses in Sugar Beets With Dalapon. L. E. Warren. *Down to Earth*, v. 9, no. 4, Spring, 1954, p. 2-4.

Includes photographs, tables, graph.

9104 Removing Tramp Iron From Chopped Hay. J. B. Dobie and F. C. Jacob. *Electronics*, v. 27, May 1954, p. 134-136.

Pickup coil in magnetic field acts with electronic system to detect and reject bailing wire in moist chopped hay traveling at up to 10,000 ft. per min. through an 8-in. blower pipe. Photographs, diagrams. 5 ref.

Agriculture

9105* Effect of Weeding on the Yield of Wheat. H. K. Pande. *Empire Journal of Experimental Agriculture*, v. 21, no. 84, Oct. 1953, p. 297-303.

Data for three successive winter seasons for grain yield per acre and per plant; ear-bearing tillers per plant for each year were statistically analyzed following method of analysis of variance due to Yates. Tables. 8 ref.

9106* Broad Spectrum Herbicides. Harold Hartogensis. *Farm Chemicals*, v. 117, Apr. 1954, p. 37-38.

Advantages, limitations, and applications. Photographs, tables.

9107* Soil Tests and Fertilizer Prescriptions. K. C. Berger. *Farm Chemicals*, v. 117, Apr. 1954, p. 47-48, 50.

Factors considered in developing fertilizer for use in specific situation include soil tests; crop to be grown; yield expected; and amounts of nutrients taken up by the crop. Tables.

9108* The Optimal Harvest Time of Pea Canning and Freezing Crops in New York State. I. The Definition of Optimal Harvest Time. II. The Short Term Prediction of Optimal Harvest Time. R. S. Mitchell and L. J. Lynch. *Food Technology*, v. 8, Apr. 1954, p. 183-188.

Includes tables, graphs. 7 ref.

9109* Cytogenetic Effects of X-Ray and Thermal Neutron Irradiation on Seeds of Barley. Richard S. Caldecott, B. H. Beard, and C. O. Gardner. *Genetics*, v. 39, Mar. 1954, p. 240-259.

Studies indicate pronounced differences in biological effect of X-rays and thermal neutrons on dormant seeds. These differences are explained on purely physical assumptions. Photographs, graphs, tables. 18 ref.

9110* Crop-Combination Regions in the Middle West. John C. Weaver. *Geographical Review*, v. 44, Apr. 1954, p. 175-200 + insert.

Includes maps, table.

9111* Effect of Maleic Hydrazide on Growth, Bolting Behaviour and Keeping Quality of Indian Radish (*Raphanus sativus* L.). R. S. Choudhri and V. B. Bhatnagar. *Indian Academy of Sciences, Proceedings*, v. 39, sec. B, Jan. 1954, p. 1-16 + 3 plates.

Includes tables, photographs. 54 ref.

9112* Progress Report on Research With Particular Reference to New Jersey Soils. Firman E. Bear. *Journal of Agricultural and Food Chemistry*, v. 2, Mar. 3, 1954, p. 244-251.

Laboratory, greenhouse, cylinder, and field work with B. Mo, Fe, Mn, Zn, Cu, Co, I, F, and Br. Soils were examined for total and available contents. Tables. 23 ref.

9113* Moving Boundaries in Agricultural Chemicals. *Journal of Agricultural and Food Chemistry*, v. 2, Mar. 17, 1954, p. 286-296.

Business outlook; major insect threats; insecticide developments; pesticide-fertilizer combinations; herbicide trends; fungicides future; antibiotics as agricultural chemicals; soil residues; and public education. Maps, graphs, photographs.

9114* Grain Storage. Physical and Chemical Consequences of Advanced Spontaneous Heating in Stored Soybeans. Max Milner and John B. Thompson. *Journal of Agricultural and Food Chemistry*, v. 2, Mar. 17, 1954, p. 303-309.

Includes tables, photographs. 39 ref.

9115* Synergism and Synergists. Review of Synergism Among Halogen-Containing Insecticides and Halogen-Containing Synergists. W. T. Sumerford. *Journal of Agricultural and Food Chemistry*, v. 2, Mar. 17, 1954, p. 310-327.

Combinations of compounds having a higher biological activity than sum of the activities of individual components. Tables. 281 ref.

9116* Carbamate Herbicides. Relative Herbicidal and Growth Modifying Activity of Several Esters of *N*-Phenylcarbamic Acid. D. K. George, D. H. Moore, W. P. Brian, and J. A. Garman. *Journal of Agricultural and Food Chemistry*, v. 2, Mar. 31, 1954, p. 356-363.

Chemical and physical properties; preliminary screening evaluation of herbicidal and plant-growth-modifying activities. Alteration of structure of alcohol portion of molecule can exert profound effects upon biological activity. Tables, graphs. 22 ref.

9117* The Metabolism of the Organic Acids of Tobacco Leaves. VII. Effect of Culture of Excised Leaves in Solutions of (+)-Tartrate. Hubert Bradford Vickery and James K. Palmer. *Journal of Biological Chemistry*, v. 207, Mar. 1954, p. 275-285.

An experimental study. Tables. 27 ref.

9118* Antibiotics in Dairy Cattle Nutrition. III. Effects of Different Levels of Aureomycin Intake Upon the Growth and Well-Being of Dairy Calves, and the Association of Differences With Changes in Environment. E. E. Bartley, F. W. Atkeson, H. C. Fryer, and F. C. Fountaine. *Journal of Dairy Science*, v. 37, Mar. 1954, p. 259-268.

Includes graph, tables. 18 ref.

9119* Anatomy and Morphology of the Seedling Roots of Four Species of the Genus Quercus. I. W. Carpenter and A. T. Guard. *Journal of Forestry*, v. 52, Apr. 1954, p. 269-274.

Methods of producing oak seedlings. Photographs, micrographs. 15 ref.

9120* Carbon 13 in Plants and the Relationships Between Carbon 13 and Carbon 14 Variations in Nature. Harmon Craig. *Journal of Geology*, v. 62, Mar. 1954, p. 115-149.

Attempts to evaluate relative effects of local environment and activities of plants on isotopic fractionation. Graph, tables. 47 ref.

9121* The Riboflavin Requirement of the Baby Pig. E. R. Miller, R. L. Johnston, J. A. Hoefer, and R. W. Luecke. *Journal of Nutrition*, v. 52, Mar. 1954, p. 405-413.

Requirement for optimum growth and feed efficiency approximates 3.0 mg./kg. of solids. 12 ref.

9122* Soil Sterilization. III. The effect of Cultivation on Ammonia and Nitrate Production in a Glasshouse Soil Steam-Sterilized *in situ*. J. N. Davies and O. Owen. *Journal of the Science of Food and Agriculture*, v. 5, Mar. 1954, p. 146-153.

Measured after subsequent cultivation under commercial conditions. Tables, graphs. 6 ref.

9123* A Study of Podzolization. III. The Mobilization of Iron and Aluminum by Rimu (*Dacrydium Cupressinum*). IV. The Mobilization of Iron and Aluminum by Picked and Fallen Larch Needles. V. The Mobilization of Iron and Aluminum by Aspen and Ash Leaves. C. Bloomfield. *Journal of Soil Science*, v. 5, no. 1, Jan. 1954, p. 39-56.

Includes tables, graphs. 10 ref.

9124* Isotopic Equilibria Between Phosphates in Soil and Their Significance in the Assessment of Fertility by Tracer Methods. R. Scott Russell, J. B. Rickson, and S. N. Adams. *Journal of Soil Science*, v. 5, no. 1, Jan. 1954, p. 85-105.

Isotopic exchange of P between solutions of orthophosphate and some solid phases. Graphs, tables. 15 ref.

9125* Losses of Nitrous Oxide From Soil. P. W. Arnold. *Journal of Soil Science*, v. 5, no. 1, Jan. 1954, p. 116-128.

Rates of evolution of N_2O and significance of phenomenon to agricultural research. Graphs, tables. 23 ref.

9126* Fertilizing Winter Crops. (Russian.) A. Kochergin. *Kolkhoznoe Proizvodstvo*, v. 14, no. 2, Feb. 1954, p. 24-25.

Advantages of mineral and organic fertilizers applied in the spring.

9127* Is Humus the Only Answer? Experiences and Reflections. E. C. Raney. *Land*, v. 12, Winter 1953-54, p. 430-433.

Humus helps preserve moisture and assists in bacterial activity by making the mineral available for plant growth. Photographs.

9128* Fertilisers and Plant Nutrients. *Manufacturing Chemist*, v. 25, Apr. 1954, p. 165-167.

14 ref.

9129* Bactericidal Radiation Reaction on Fungus Spores. (Russian.) Iu. P. Niuksha. *Mikrobiologiia*, v. 22, no. 6, Nov.-Dec. 1953, p. 678-681.

Fungus spores which destroy books were reduced but forty times more radiation is required than for non-spore forming microorganisms. Graphs. 11 ref.

9130* Threonine and Valine Requirements of Growing Swine. *Nutrition Reviews*, v. 12, Mar. 1954, p. 68-69.

Review of literature.

9131* Plugging of Vessels by Tyloses and Gums in Wilting Oaks. B. Esther Struckmeyer, C. H. Beckman, J. E. Kuntz, and A. J. Riker. *Phytopathology*, v. 44, Mar. 1954, p. 148-153.

Changes within wilt-infected northern pin oaks studied by histological methods during various stages of disease development. Drawings, micrographs. 14 ref.

9132* Dynamics of Deposition and Tenacity of Fungicides. Saul Rich. *Phytopathology*, v. 44, Apr. 1954, p. 203-213.

Includes tables, graphs. 27 ref.

9133* Progress in Forecasting Late Blight of Potato and Tomato. R. A. Hyre. *Plant Disease Reporter*, v. 38, Apr., 1954, p. 245-253.

Improved method forecasts late blight, based on analysis of rainfall and temperature data by means of moving graphs. Graphs, table. 14 ref.

9134* Some Effects of Heavy Metals on Plants Grown in Soil Culture. II. The Effect of Nickel on Fertiliser and Soil Phosphate Uptakes and Iron and Nickel Status of Tomato. D. J. D. Nicholas and W. D. E. Thomas. *Plant and Soil*, v. 5, Feb. 1954, p. 182-193 + 1 plate.

Includes graphs, photographs, tables. 12 ref.

9135 Polythene Film for Horticulture. E. R. Webber. *Plastics*, v. 19, Apr. 1954, p. 108-109.

Applies to rooting and grafting. Reviews air-layering process. Diagrams.

9136* Influence of Flood Irrigation on the Soil-Building Process. (Russian.) A. D. Shchegoleva. *Pochvovedenie*, 1953, no. 11, Nov., p. 14-25.

Irrigation by flooding over a period of 15 to 20 yrs. improves properties of an alkali soil. Tables. 7 ref.

9137* Recent Literature on Problem of Humus. (Russian.) M. M. Kononova. *Pochvovedenie*, 1953, no. 12, Dec., p. 45-61.

Nature of compost substances; new methods of investigation; biochemistry of humus formation; and control of humus accumulation in cultivated soils. 77 ref.

9138* Nature and Properties of Products Produced by Interaction of Humic Acids and Humates With Sesquioxides. (Russian.) L. N. Aleksandrova. *Pochvovedenie*, 1954, no. 1, Jan., p. 14-29.

Experimental results. Includes Fe and Al humic compounds and gels. Graphs, tables. 15 ref.

9139* Fungicides for the Control of Damping-Off in Tomatoes. M. C. Strong. *Quarterly Bulletin (Michigan State College Agricultural Experiment Station)*, v. 36, Feb. 1954, p. 285-290.

Results of dust, soil, and sprinkle treatments. Tables, photographs.

9140* Availability of Soil Molybdenum as Shown by the Molybdenum Content of Many Different Plants. W. O. Robinson and Glen Edgington. *Soil Science*, v. 77, Mar. 1954, p. 237-251.

Includes tables. 9 ref.

9141* Plant Studies With Radioactive Chlorine. S. J. Toth and A. E. Kretschmer. *Soil Science*, v. 77, Apr. 1954, p. 293-302.

Investigates suitable assay method for Cl^{36} contained in plant tissue; determines distribution and direction of movement of isotope in various plant species; and whether foliar-applied Cl^{36} is absorbed. Tables, radiographs. 9 ref.

9142* Application of Industrial Heat Wastes to Suburban Hot House and Truck Farming. (Russian.) A. Antoniuk. *Sotsialisticheskoe Sel'skoe Khoziaistvo*, v. 24, no. 10, Oct. 1953, p. 44-50.

Economic feasibility of using heat of power stations, factories, and plants for heating seed beds. Table.

9143* Means of Increasing Butter-Fat Production of Cows. (Russian.) E. Novikov. *Sotsialisticheskoe Sel'skoe Khoziaistvo*, v. 24, no. 12, Dec. 1953, p. 20-27.

Suggests cross-breeding of domestic cattle with Zebu. Tables.

9144* Pest Control in Enclosed Spaces. Continuous-Flow Aerosols and Insecticidal Lacquers. F. G. Sarel Whitfield, A. Howard Baker, and G. F. H. Whitney. *Times Review of Industry*, v. 8, new ser., Apr. 1954, p. 24-25, 29.

Properties of new urea-formaldehyde resins in which insecticides can be included. Micrograph, photograph. 15 ref.

9145* Application of Radioactive Phosphorus in Agricultural Chemistry and Soil Investigatinos. (Russian.) A. V. Sokolov. *Vestnik Akademii Nauk SSSR*, 1953, no. 9, Sept., p. 28-34.

Brief half-life of P^{32} permits short-term experimentation. Emitted β particles easily traced with Geiger counter. Method of application.

9146* The Effect of Sodium 2,4-Dichlorophenoxyethyl Sulfate on the Growth and Yield of Strawberries. Donald R. Isleib and Richard J. Aldrich. *Weeds*, v. 2, no. 4, Oct. 1953, p. 262-270.

Strawberry yields were not reduced by rates of SES necessary to control weeds, providing chemical was not in soil during early rooting of parent or runner plants. Tables, photographs. 15 ref.

9147* Helicopter Spraying for the Control of Leaf Disease of Rubber in Ceylon. *World Crops*, v. 6, Mar. 1954, p. 117-118.

Equipment, technique, performance, and effectiveness. Photographs.

9148* Constitution and Effect of Insecticides. VIII. Comparative Consideration on Configuration and Contact-Insecticidal Effectiveness of DDT Analogues. (German.) Randolph Riemschneider and Hans-Dietrich Otto. *Zeitschrift für Naturforschung*, v. 9b, no. 2, Feb. 1954, p. 95-108 + 2 plates.

Relationship between configuration of molecules and their physical and chemical propreties. Tables, photographs, micrographs. 28 ref.

Books and Miscellaneous Publications

9149 The Organization of Agricultural Research in Europe. Ralph W. Phillips, I. Moskovits, and F. F. Lininger, editors. 66 p. 1953. Food and Agricultural Organization of the United Nations, Rome. (S541 P54o)

Laboratories, administration, and financing.

See also:

9150 (path of carbon in photosynthesis)
9154 (conversion of Parathion by insects)
9291 (acetylene compounds in plant)
9330 (insecticides in higher plants)

BIOCHEMICAL AND BIOPHYSICAL RESEARCH

9150 The Path of Carbon in Photosynthesis. XXI. The Cyclic Regeneration of Carbon Dioxide Acceptor. J. A. Bassham, A. A. Benson, Lorel D. Kay, Anne Z. Harris, A. T.

Biochemical and Biophysical Research

Wilson, and M. Calvin. *American Chemical Society, Journal*, v. 76, Apr. 5, 1954, p. 1760-1770.

Plants were exposed to $C^{14}O_2$ for short intervals. Products of CO_2 reduction analyzed by paper chromatography and radioautography. Diagrams, graphs, tables. 25 ref.

9151* Tall Oil Studies. III. Bactericidal Activity of Polyethenoxy Tallate Ozonides. Identification of the Active Principle. H. J. Ferlin, A. T. Ballun, and J. V. Karabinos. *American Oil Chemists' Society, Journal*, v. 31, Mar. 1954, p. 103-104.

Includes graph, table. 6 ref.

9152* The Stickland Reaction. B. Nisman. *Bacteriological Reviews*, v. 18, Mar. 1954, p. 16-42.

Includes tables, graphs, diagrams. 42 ref.

9153* On the Interpretation of the pH Variation of the Maximum Initial Velocity of an Enzyme-Catalyzed Reaction. (English.) Robert A. Alberty and Vincent Massey. *Biochimica et Biophysica Acta*, v. 13, no. 3, Mar. 1954, p. 347-353.

Dissociation of two acid groups which affect enzyme activity. Table, graph. 10 ref.

9154* Conversion of O,O-Diethyl-O-*p*-Nitrophenyl Thiophosphate (Parathion) Into an Acetylcholinesterase-Inhibitor by the Insect Fat Body. (English.) Geertruy C. Kok and J. N. Walop. *Biochimica et Biophysica Acta*, v. 13, no. 4, Apr. 1954, p. 510-515.

Attempts to localize organ or organs responsible for this conversion. Table, graphs. 13 ref.

9155* A Micro-Method and Apparatus for the Multiple Determination of Rates of Destruction of Bacteria and Bacterial Spores Subjected to Heat. Joseph A. Stern nad Bernard E. Proctor. *Food Technology*, v. 8, Mar. 1954, p. 139-143.

Apparatus treats ten or more samples simultaneously; can be used over a wide range of temperatures. Diagrams, table, graph. 17 ref.

9156* Growth and Mutation of Bacteria During Continuous Irradiation. B. A. Rubin. *Journal of Bacteriology*, v. 67, Mar. 1954, p. 361-368.

Experimental study. Graphs. 16 ref.

9157* Crystalline Papain. I. Preparation, Specificity, and Activation. J. R. Kimmel and Emil L. Smith. **II. Physical Studies; the Mercury Complex.** Emil L. Smith, J. R. Kimmel, and Douglas M. Brown. **III. Amino Acid Composition.** Emil L. Smith, Anne Stockell, and J. R. Kimmel. **IV. Free Amino Groups and N-Terminal Sequence.** E. O. P. Thompson. *Journal of Biological Chemistry*, v. 207, Apr. 1954, p. 533-574.

Includes tables, micrograph, graphs, diagrams. 99 ref.

9158* Chemotherapy and Selective Toxicity. III. Chelation of Trace-Metals. J. L. Stoves. *Manufacturing Chemist*, v. 25, Apr. 1954, p. 148-150.

Includes table. 9 ref.

9159 Problems in Using High-Voltage Electrons for Sterilization. W. D. Bellamy and E. J. Lawton. *Nucleonics*, v. 12, Apr. 1954, p. 54-57.

Bacteria and enzyme inactivation; dose-rate dependence; and side effects. Shows where research is needed before commercial use is possible. Tables, graphs. 13 ref.

9160* Radioactivity in Biology. *Research Today*, v. 10, no. 1, 1954, p. 3-24.

Possible applications and experiments. Tables. 35 ref.

9161* New Antiseptic for Soap. L. J. Vinson. *Soap and Sanitary Chemicals*, v. 30, Apr. 1954, p. 44-47, 103.

Tetramethylthiuram disulfide (TMTD) new germicidal agent for soap, has skin deodorant properties. Tables, photographs. 11 ref.

Books and Miscellaneous Publications

9162 The Yeasts. A Taxonomic Study. J. Lodder and N. J. W. Kregervan Rij. 713 p. 1952. North-Holland Publishing Co., Amsterdam. (QR151 L82y)

Classification, characteristics, and behavior of 1317 strains of yeasts.

9163 Antibiotics. A Survey of Their Properties and Uses. 290 p. 1952. The Pharmaceutical Press, London. (RS161 An87)

Penicillin, streptomycin, chlor-amphenicol, and aureomycin; and commercial manufacture, chemistry, stability, standards, clinical applications, veterinary practice, and pharmacy.

See also:

9087 (toxicity of aldrin)
9088 (mode of action of organic fungicides)
9129 (bactericidal action of radiation)
9324 (biosynthesis of fatty acids)
9327 (toxicity of soaps and detergents)
9329 (biological effects of Fl and its compounds)
9411 (growth of fungi on paint films)
9720 (hydrobiology)

CERAMICS AND CONCRETE

9164 Use of the Solar Furnace for Studying the System Alumina-Silica. Willi M. Conn. *American Ceramic Society Bulletin*, v. 33, Mar. 1954, p. 69-72.

Modified version of paper presented at 53rd Annual Meeting of Amer. Ceram. Soc., Chicago, Ill., Apr. 1951. Operating characteristics of modern solar furnaces. Application to study of liquidus temperatures in Al_2O_3-SiO_2 system. Photographs, tables, graph. 11 ref.

9165 Mold Irons and the Glass Mold Situation. E. R. Flatter. *American Ceramic Society, Bulletin*, v. 33, Apr. 1954, p. 101-103.

No one type of mold iron is applicable. New nodular type graphite iron indicates solution of more critical glass mold problems.

9166 Monolithic Refractories in Fluid Catalytic Cracking Refinery Units. W. B. Paul, Jr. *American Ceramic Society, Bulletin*, v. 33, Apr. 1954, p. 108-110.

Applies castable refractories in fluid catalytic liners, regenerators, reactors, cyclones, and stacks. Process indicates how refractory mixes are selected to meet various conditions of service. Photographs.

9167 Ultra-Fine Talcs in Low-Loss Steatite Bodies. R. S. Lamar and W. W. Gaskins. *American Ceramic Society, Bulletin*, v. 33, Apr. 1954, p. 111-116.

Effects of particle size distribution of talc upon dielectric and other physical properties of steatite body. Tables, graphs, micrographs. 15 ref.

9168 The Zirconia—Titania System. Frank H. Brown, Jr. and Pol Duwez. *American Ceramic Society, Journal*, v. 37, Mar. 1954, p. 129-132.

Phase diagram based on existence of a hitherto unreported compound, $ZrTiO_4$. Diagram, graphs, tables. 10 ref.

9169 Fundamental Study and Equipment for Sintering and Testing of Cermet Bodies. VI. Fabrication, Testing, and Properties of 72 Chromium—28 Alumina Cermets. Thomas S. Shevlin. *American Ceramic Society, Journal*, v. 37, Mar. 1954, p. 140-145.

Physical and mechanical properties, impact resistance, and thermal effects. Graphs, micrograph, table, photographs. 8 ref.

9170 Thermal Strains During Firing of a Ceramic Body. Stephan P. Mitoff and Joseph A. Pask. *American Ceramic Society, Journal*, v. 37, Apr. 1954, p. 168-172.

Ceramic bodies tend to crack in firing owing to thermal stress. Use of physical measurement of thermal gradient as affected by firing rate and thermal reactions; and coefficient of thermal expansion and maximum strain at each temperature. Graphs, diagram.

9171 Oxidation Resistances of Ternary Mixtures of the Carbides of Titanium, Silicon, and Boron. Oliver E. Accountius, Harry H. Sisler, Thomas S. Shevlin, and George A. Bole. *American Ceramic Society, Journal,* v. 37, Apr. 1954, p. 173-177.

Includes tables, micrographs, graph.

9172* Oxide Systems With Interesting Electrical and Magnetic Properties. (German.) E. J. W. Verwey. *Angewandte Chemie,* v. 66, no. 7, Apr. 7, 1954, p. 189-192.

Oxidic multi-component systems from first transition series of periodic system. Newly developed ceramic materials important as semi-conductors. Diagrams, graphs, table. 12 ref.

9173* Stress-Optical Investigation of Thermal Expansion Coefficients of Glasses. (German.) H. Schwieger and H. Fiedler. *Annalen der Physik,* v. 14, nos. 1-2, Jan. 5, 1954, p. 64-86.

Method of determination, modulus of elasticity, and stress-optical constants at 25 to 100 C. Diagrams, graphs, tables. 4 ref.

9174 A Study of Some Operations Involved in Cement Analysis. Leonard Bean and Ethel J. Hackney. *ASTM Bulletin,* 1954, no. 197, p. 43-48.

Physical and chemical tests give reproducible results, are not too time consuming, and can be performed with equipment usually found in an average well-equipped laboratory. Tables. 8 ref.

9175 Ceramic-Coated Metals for Industry. Burnham W. King. *Battelle Technical Review,* v. 3, Apr. 1954, p. 39-42.

Chemical and mechanical properties of materials; nature of bond between ceramic coating and metal; protection afforded metal; and industrial applications. Graph, drawing.

9176* The Effect of Magnesium Oxide in Aluminum Oxide-Rich Alumina Cements. (German.) E. Eipeltauer. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 99, no. 2, Feb. 1954, p. 27-32.

Additions of more than 3% MgO reduced strength properties severely. Tables, graphs, micrographs. 3 ref.

9177* The Electrical Resistance of High-Vacuum Sintered Magnesium Oxide. (German.) W. Weigelt and G. Haase. *Berichte der deutschen kermischen Gesellschaft,* v. 31, no. 2, Feb. 1954, p. 45-48.

Measured between 300 and 2000 C. Diagram, graphs. 2 ref.

9178* Electron Microscopic Analysis of Structures of Ceramic Materials. II. (German.) Hermann Pfisterer. *Beriche der deutschen keramischen Gesellschaft,* v. 31, no. 3, Mar. 1954, p. 72-77.

Comparison of structures of porcelain insulators and china; surfaces of quartz and quartz glass and their behavior during etching; effects of sintering on dielectric properties; and fracture-structure studies of ferrites. Micrographs. 14 ref.

9179 Fly Ash in Large Dams. *Bituminous Coal Research,* v. 13, no. 4, Dec.-Mar. 1954, p. 4-5, 15.

Pozzolanic fly ash can replace all or part of the portland cement in concrete, giving improved workability, high ultimate strength, less heat of hydration, and greater impermeability. Photographs.

9180 Slagging of Navy Boiler Refractories. William C. Bell, Irving W. Gower, and John R. Hart. *Brick & Clay Record,* v. 124, Mar. 1954, p. 87 + 6 pages.

Test evaluates resistance of naval boiler refractories to Na_2SO_4 slag. Photographs, diagrams.

9181* Glaze Binders. Thomas Knapp. *British Clayworker,* v. 63, Apr. 15, 1954, p. 15, 28.

Properties of alcohols, cellulose derivatives, sugar, starches, flours, gums, and wax emulsions.

9182* Tunnel Kilns and Fuel Efficiency. H. H. Macey. *British Clayworker,* v. 63, Apr. 15, 1954, p. 16-21.

Review of controversial subject. Tables.

9183 Permanent Magnets of Barium Oxide and Ferric Oxide. H. Fahlenbrach and W. Beister. *Henry Brutcher, Altadena, Calif., Translation no.* 3229, 19 p. (From *Archiv für das Eisenhüttenwesen,* v. 24, nos. 11-12, 1953, p. 523-528.)

Previously abstracted from original.

9184* Properties and Applications of Iron Blast Furnace Slag. J. R. Wallace, P. Fedora, and N. D. Weiner. *Canadian Mining and Metallurgical Bulletin,* v. 47, no. 503, Mar. 1954, p. 160-169; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 57, 1954, p. 92-101.

History; types of slag; composition; and properties. Used for railway ballast; concrete; highway and airport construction; and fertilizer. Tables, graphs, photographs, diagrams. 9 ref.

9185 Annular Ceramic Tube. W. E. Coykendall. *Ceramic Age,* v. 63, Mar. 1954, p. 33-36; disc., p. 36.

Mo-Mn joining process used for U.H.F. power triode with 30 to 2,000 Mc range and 200 to 700 watts output. Photographs.

9186 High Temperature Metal Ceramic Seals. Harry Bender. *Ceramic Age,* v. 63, Apr. 1954, p. 15 + 9 pages.

Telefunken process, hydride method, and active metal technique. Tables, photographs, micrographs. 35 ref.

9186a* Zircon and Zirconia. W. L. German. *Ceramics,* v. 5, Feb. 1954, p. 540-544.

Uses of versatile materials for ceramic and allied industries. 20 ref.

9187* Electrical Elements, With Some Application to Intermittent Kilns. T. E. Litherland. *Ceramics,* v. 5, Feb. 1954, p. 559-563.

Method of discerning element likely to give reasonable service in ceramic kilns.

9187a Electric Glass Furnaces Uses Moly Electrodes. *Chemical Engineering,* v. 61, May 1954, p. 136, 138.

Melting glass by passing electric current through it has proved economical. Remodeled furnace boasts greater flexibility, longer life expectancy.

9188 Glass Considered as a Polymer. II. J. M. Stevels. *Glass Industry,* v. 35, Mar. 1954, p. 135-138, 160.

Thermal polymerization and vibrations of glass network. Graphs, tables. 14 ref.

9189* The Ceramic Drying Conference, 1953. *Institute of Fuel, Journal,* v. 27, Mar. 1954, p. 114-141.

Includes "Introduction", S. R. Hind; "Drying in Tile Manufacture", L. Bullin; "Notes on the Efficiencies of Ceramic Driers", J. S. Jones; "Jet-Drying of Ceramic Clayware and Dipped Ware", A. J. Dale and G. W. Bird; and "Drying of Sanitary Earthenware", A. J. Dale and J. A. Johnson.

9190 Borides Designed for High Temperature Use. Paul Schwarzkopf and F. W. Glaser. *Iron Age,* v. 173, Apr. 1, 1954, p. 138-139.

Sintered borides of Zr, Cr and Mo, developed to meet special defense needs, have potential applications in industry. Table, photograph, graph.

9191* Absorption Spectrum of Lead Glasses in the Ultraviolet Band. (Russian.) V. A. Florinskaia, A. V. Iakovleva, R. S. Pechenkina, and M. K. Ivanova. *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia,* v. 17, no. 6, 1953, p. 736-739.

Optical flint glass and Pb glasses in the system Na_2O-SiO_2-PbO were examined. Graphs, diagram. 11 ref.

9192* Some Observations on the Relation Between Isomorphism and Properties of Clays. William D. Johns and Edward C. Jonas. *Journal of Geology,* v. 62, Mar. 1954, p. 163-171.

Variations in chemical bonding caused by isomorphism in layer silicates, are related to polarization of various ions beyond the co-ordination system in which the substitution takes place. Diagrams. 12 ref.

9193 Electron Micrographic Studies in the System BeO-In_2O_3. C. R. Adams and W. O. Milligan. *Journal of Physical Chemistry,* v. 58, Mar. 1954, p. 219-222.

Includes charts, electron micrographs. 6 ref.

Ceramics and Concrete

9194* Investigations on Silicide Systems. (German.) H. Nowotny, R. Machenschalk, R. Kieffer, and F. Benesovsky. *Monatshefte für Chemie*, v. 85, no. 1, Feb. 15, 1954, p. 241-244.

X-ray study on solubilities of $TiSi_2$-$ZrSi_2$, $TiSi_2$-VSi_2, $ZrSi_2$-VSi_2, V_3Si-Cr_3Si, and V_3Si-Mo_3-Si systems. Tables, graphs. 6 ref.

9195* The Ternary Molybdenum-Silicon-Carbon System. (German.) H. Nowotny, E. Parthé, R. Kieffer, and F. Benesovsky. *Monatshefte für Chemie*, v. 85, no. 1, Feb. 15, 1954, p. 255-272.

Thermal, X-ray, and microscopic studies and melting point measurements. Effect of C or SiC on $MoSi_2$ glowbars at high temperatures. Tables, graphs, micrograph, diagrams. 13 ref.

9196 Sand for Acid Open Hearths. Douglas C. Williams. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 42-45; disc., p. 51-56.

Composition, behavior, and applications of suitable material. Tables. 14 ref.

9197 Bottom Repair in Acid Open Hearth Furnaces. J. Benedict Kopec. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 46-51; disc., p. 51-66.

Variables in obtaining good repairs. Tables, graphs.

9198 Reflection and Transmission Spectra of Potassium-Silicate Glasses in the Infrared. V. A. Florinskaya and R. S. Pechenkina. *National Science Foundation Translation, no.* 108, Nov. 1953, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 92, 1953, p. 59-62.)

Transmission spectra studies of two-component K_2SiO_3 glasses with molecular K content varying from 15 to 35%. Reflection spectra of some of these glasses before annealing and after prolonged heat treatment. Graphs. 7 ref.

9199 Scientific Approach to New Ceramics. I-II. W. J. Kramers. *Research*, v. 7, Mar. 1954, p. 101-110; Apr. 1954, p. 142-151.

Ceramic materials suitable for use in fabrication and process metallurgy, in various devices of an electrical nature, and as substitutes for metals in components required to withstand considerable stress at high temperatures. Photographs, micrographs, graphs, oscillogram, diagrams, tables. 149 ref.

9200 Experience With Oxygen Lance Cutting. (German.) Kurt Boeckhaus. *Schweissen und Schneiden*, v. 6, no. 3, Mar. 1954, p. 102-105.

Successful and economical use for drilling and cutting reinforced concrete. Photographs, diagrams.

9201* Ferroxcube and Ferroxdure Electroceramics With Special Magnetic Properties. (German.) G. Schilplin. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 2, Feb. 1954, p. 51-56.

Includes photographs, tables, graphs. 9 ref.

9202* Microporous Concrete. (German.) Erich Patschke. *Silikat Technik*, v. 5, no. 2, Feb. 1954, p. 63-74.

Mechanical and physical properties of blocks with different fillers. Tables, graphs, photographs.

9203 The Effect of Composition on the Manufacture of Glassware by Pressing. H. S .Y. Gill. *Society of Glass Technology, Journal*, v. 38, no. 180, Feb. 1954, p. 17T-33T.

Influence of article design, molding equipment, press details, speed of pressing, temperature of glass, and glass composition. Tables, graphs, diagrams. 3 ref.

9204* The Effect of Small Steatite Additions to Basic, Neutral, and Acid Sagger Bodies. (German.) Friedrich Zapp, Herwart Metzel, Siegfried Goller, Hermann Kerli, and Richard Seifert. *Sprechsaal*, v. 87, no. 5, Mar. 5, 1954, p. 97-100.

Steatite additions improved molding properties and fired strength; decreased coefficient of expansion of the body. Tables, graphs. (To be continued.)

9205* Hard and Soft Porcelain Bodies and Glazes. (German.) Fritz Viehweger. *Sprechsaal*, v. 87, no. 7, Apr. 5, 1954, p. 145-147.

Composition of matt glazes, color pigments, and colored chinaware bodies. Tables.

9206* The High-Temperature Strength of Fire-Clay Bricks. (German.) Werner Heiligenstaedt. *Stahl und Eisen*, v. 74, no. 7, Mar. 25, 1954, p. 402-406.

Measuring devices; test results; and determination of deformation rate. Diagrams, graphs. 5 ref.

9207* Extra-Strong Artificial Stone. Microlite. (Russian.) I. I. Kitaigorodskii and N. M. Pavlushkin. *Steklo i Keramika*, v. 10, no. 11, 1953, p. 4-7.

Physical and chemical qualities. Finest crystalline structure of all corundum materials. Micrographs, tables, graph.

9208* Structure of Complex Silicate Glasses. (Russian.) A. A. Appen. *Zhurnal Prikladnoi Khimii*, v. 27, no. 2, Feb. 1954, p. 121-126.

Application of coordination principle of ion location to cations with weak force field. Function of composition, temperature, and time. Table. 12 ref.

Books and Miscellaneous Publications

9209 Glass Research Methods. Ralph K. Day. 235 p. 1953. Industrial Publications, Inc., Chicago. (TP857 D33g)

Covers vitreous attitude; basic working laws of physics and chemistry; methods and devices; and glass properties at room and elevated temperatures.

9210 Selected Government Research Reports. v. Ceramics and Glass. 148 p. 1952. Her Majesty's Stationery Office, London. (TP807 G79.7c)

Reports on refractory coatings for metals; apparatus for determining mechanical and physical properties of ceramic materials; applications of ceramic bodies in heat engines; hot pressing ZrC; fractures in glass; and testing of glass optical flats.

9211 A Microscopical Investigation of Mechanical Breakdown in Sintered Aluminum Oxide, Including Observations on Reflected Light Examination. J. P. Roberts. Paper from SELECTED GOVERNMENT RESEARCH REPORTS. v. X. CERAMICS AND GLASS. p. 15-29. 1952. Her Majesty's Stationery Office, London. (TP807 G79.7c)

Includes diagrams, micrographs, table. 15 ref.

9212 Axial Loading of Sintered Alumina Tensile Test Pieces. J. P. Roberts and W. Watt. Paper from SELECTED GOVERNMENT RESEARCH REPORTS. v. X. CERAMICS AND GLASS. p. 31-50, 1952. Her Majesty's Stationery Office, London. (TP807 G79.7c)

Method for obtaining a close approach to true axial tensile loading of sintered alumina test peices and results at room temperature. Diagrams, photographs, graphs, tables. 14 ref.

9213 The Variation of Resistivity With Temperature of Sintered Aluminum Oxide Used for the Insulators of Sparking Plugs. E. C. Railton. Paper from SELECTED GOVERNMENT RESEARCH REPORTS. v. X. CERAMICS AND GLASS. p. 57-69. Her Majesty's Stationery Office, London. (TP807 G79.7c)

Includes diagrams, table, graphs. 4 ref.

9214 Thermal Stresses in Non-Ductile High Temperature Materials. F. J. Bradshaw. Paper from SELECTED GOVERNMENT RESEARCH REPORTS. v. X. CERAMICS AND GLASS. p. 71-84. 1952. Her Majesty's Stationery Office, London. (TP807 G79.7c)

Thermal stresses which may occur in practice on turbine blades and rocket nozzles. Graphs. 7 ref.

9215 The Improvement of Ceramics for Use in Heat Engines. F. J. Bradshaw. Paper from SELECTED GOVERNMENT RESEARCH REPORTS. v. X. CERAMICS AND GLASS. p. 85-90. 1952. Her Majestry's Stationery Office, London. (TP807 G79.7c)

Ceramics are assessed for thermal shock in terms of a simple shock index. Graphs, table. 5 ref.

9216 Some Experiments on the Hot Pressing of Zirconium Carbide Powder at 2000°C. A. R. Wall and W. Watt. Paper from SELECTED GOVERNMENT RESEARCH REPORTS. v. X. CERAMICS AND GLASS. p. 91-105. 1952. Her Majesty's Stationery Office, London. (TP807 G79.7c)

Includes diagrams, tables, photograph, micrographs, graph. 14 ref.

See also:
9353 (absorption studies on clay minerals)
9441 (behavior of metal-oxide combinations)
9490 (glass electromagnetic shielding)
9541 (semi-conducting oxide films)
9746 (refractory linings of rocket motors)
9865 (ceramics for high-temperature use)
9908 (refractories in Cu smelting)
9926 (refractories in open-hearth furnaces)
9927 (monolithic refractories)
9936 (rammed refractories in open-hearth furnaces)
9942 (refractories for open-hearth)
10276 (non-destructive testing of concrete)
10469 (glass fiber textiles)
10487 (ceramic-metal seals)
10496 (ceramic-metal seals)

CHEMICAL ENGINEERING

9217 The Processing Possibilities of Ultrasonics. Oskar Mattiat. *Acoustical Society of America, Journal*, v. 26, Mar. 1954, p. 241-243.

Use of ultrasonic waves in extraction, dispersion, emulsification, flotation ore dressing, soldering, drilling, and cleaning. 12 ref.

9218* Theoretical Principles of Aeration. Paul D. Haney. *American Water Works Association, Journal*, v. 46, Apr. 1954, p. 353-376.

Aerator types, uses, and fundamental concepts. Graphs, tables. 47 ref.

9219 Basic Chemicals From Natural Gas. Norman C. Updegraff. *Canadian Chemical Processing*, v. 38, Mar. 1954, p. 28 + 9 pages.

Methods for processing natural gas into valuable chemicals such as H_2, CO, NH_3, HCN, and others. Photographs, table, diagrams. 11 ref.

9220 Put Dimensional Analysis to Work. J. E. Pierce. *Chemical Engineering*, v. 61, Apr. 1954, p. 185-190.

Shorthand system deals systematically with relations between units of measurement of physical quantities. Graph, tables, photographs. 12 ref.

9221 Chemical Engineering Fundamentals. II-III. Chemical Equilibrium. Thomas E. Corrigan. *Chemical Engineering*, v. 61, Apr. 1954, p. 212 + 4 pages; May 1954, p. 202 + 4 pages.

Significance of equilibrium constant and extent of reaction. Mathematical relationships between enthalpy, entropy, and equilibrium composition. Graph. 2 ref.

9222 Continuous Countercurrent Ion Exchange Trace Components. N. K. Hiester, E. F. Fields, R. C. Phillips, and S. B. Radding. *Chemical Engineering Progress*, v. 50, Mar. 1954, p. 139-150.

Materials, apparatus, experimental procedures, and interpretation of results. Diagrams, graphs, photographs, tables. 13 ref.

9223 Mixer-Settler Extraction Equipment. Milton W. Davis, Jr., Thomas E. Hicks, and Theodore Vermeulen. *Chemical Engineering Progress*, v. 50, Apr. 1954, p. 188-197.

Equipment provides intensive contact between phases that is required in processes involving complex compounds of the heavy metals. Design and operation of known types of mixer-settler units. Table, diagrams, photographs. 13 ref.

9224* Circulation Inside Gas Bubbles. F. H. Garner and D. Hammerton. *Chemical Engineering Science*, v. 3, Feb. 1954, p. 1-11.

Velocities of bubbles in water were measured. Discrepancies in data considered in terms of temperature, rate of formation, wall effect, and contamination from surface active agents. Tables, graphs. 29 ref.

9225* The Distribution of Residence-Times in an Industrial Fluidised Reactor. P. V. Danckwerts, J. W. Jenkins, and G. Place. *Chemical Engineering Science*, v. 3, Feb. 1954, p. 26-35.

Flow through fluidized bed itself is much closer to piston-flow than to complete mixing with hold-back of less than 0.1. Diagrams, tables, graphs. 8 ref.

9226* Extractive Crystallization With Urea. E. V. Truter. *Chemical & Process Engineering*, v. 35, Mar. 1954, p. 75-80.

Structure and properties of urea complexes. Fundamental principles governing separation of mixtures. Table, graphs, diagrams. 10 ref.

9227* Short Distance Fractionation. (German.) Gustav Ed. Utzinger. *Chemie-Ingenieur-Technik*, v. 26, no. 3, Mar. 1954, p. 129-131.

Process and apparatus. Efficiency compared with ordinary method. Diagrams, table. 5 ref.

9228* Flow Technology in Construction of Driers. (German.) K. Kröll. *Chemie-Ingenieur-Technik*, v. 26, no. 3, Mar. 1954, p. 132-140.

Uniform drying and minimum loss of flow energy by regulation of air flow. Diagrams, graphs, photographs. 13 ref.

9229* The Action of Magnus Effect in Laminar Flows. I. The Lateral Force in Particle Sedimentation. (German.) Hans Tollert. *Chemie-Ingenieur-Technik*, v. 26, no. 3, Mar. 1954, p. 141-150.

Compares number of particles close to the wall with those near center of apparatus. Diagrams, graphs, tables. 28 ref.

9230* Iodine as a Raw Material in the Chemical Industry. (German.) Wilhelm von Haken. *Chemische Industrie*, v. 6, no. 3, Mar. 1954, p. 112-114.

Production in various countries. Use in pharmaceutical and other industries.

9231* Cathodic Atomization of Fused Electrolytes. (French.) Pierre Barret. *Comptes rendus*, v. 238, no. 10, Mar. 8, 1954, p. 1125-1127.

Compares phenomenon with atomization of dissolved electrolytes. 6 ref.

9232* Some Laboratory Test Results of Preparation No. 1. (Substitute for Copper Sulfate.) (Russian.) A. Efimov, V. Orshanskaia, and N. Sokolova. *Dostizheniia Nauki i Peredovogo Opyta v Sel'skom Khoziaistve*, 1954, no. 1, Jan., p. 78-81.

Experimental procedure. Photographs.

9233 Cation Exchange Process for the Preparation of Potassium Cyanide. C. H. Lemke. *Electrochemical Society, Journal*, v. 101, Apr. 1954, p. 203-207.

Equilibrium data for reactions of Na+KCN, KCl+NaCN, and KOH+NaCN in fused state. Diagram, tables, graphs. 4 ref.

9234* The Behavior of Solid Particle Beds in Vertically Oscillating Containers. (German.) W. Kroll. *Forschung auf dem Gebiete des Ingenieurwesens*, v. 20, Ausgabe B, no. 1, 1954, p. 2-15.

New theory with resulting equations for particle path and gas pressure. Diagrams, tables, graphs, photographs. 4 ref.

9235 Desalting Brackish Waters With Ion Exchange Resin Membranes. T. R. E. Kressman. *Industrial Chemist and Chemical Manufacturer*, v. 30, Mar. 1954, p. 99-101.

Outlines desalting methods and process using electrodialysis in multi-compartment cells. Table, diagrams. 3 ref.

9236 Continuous Flow of Materials Through Processing Units. P. V. Danckwerts. *Industrial Chemist and Chemical Manufacturer*, v. 30, Mar. 1954, p. 102-106.

Importance of manner in which material passes through continuous-flow equipment. Methods of determining spread of residence-times of individual particles. Graphs. 13 ref.

Chemical Engineering

9237 The Viscosity-Temperature Function. A. V. Brancker. *Industrial Chemist and Chemical Manufacturer*, v. 30, Mar. 1954, p. 112-118.

Existing equations for viscosity-temperature functions of liquids; tentative solution to problem of viscosity-temperature correlation. Graphs, tables. 27 ref.

9238 A Staff-Industry Collaborative Report. Stengel Process Ammonium Nitrate. Albert S. Hester, J. J. Dorsey, Jr. and J. T. Kaufman. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 622-632.

Equipment, plant layout, and operating techniques. Photographs, table, diagrams. 6 ref.

9239 Separation of Gases by Plastic Membranes. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 733-742.

Includes "Permeation Rates and Extent of Separation", David William Brubaker and Karl Kammermeyer; and "New Diffusion Cell Design", James O. Osburn and Karl Kammermeyer. Diagrams, tables, graphs, photographs. 17 ref.

9240 Spray Drying. William M. Clelland. *Industrial Heating*, v. 21, Mar. 1954, p. 544-551.

Process and basic designs of equipment. Diagrams.

9241* Chemical Engineering. VIII. Solvent Extraction. D. C. Freshwater. *Institute of Petroleum Review*, v. 8, Mar. 1954, p. 55-58.

Solvent extraction first used commercially with liquid SO_2 to remove aromatic hydrocarbons from kerosene. Later applied to refining of lubricating oil, solvents were used to improve viscosity-index by removing aromatic compounds or compounds of high C:H ratios. Principles presented. Diagrams. 3 ref.

9242 Control of Chemical Processes. A. J. Young. *Instruments and Automation*, v. 27, Mar. 1954, p. 440-448.

Typical pneumatic and hydraulic controllers of American and British make. Diagrams, photographs.

9243 Generalization of the Radial Dilution Square Law in Ultracentrifugation. Rodes Trautman and Verne Schumaker. *Journal of Chemical Physics*, v. 22, Mar. 1954, p. 551-554.

Classical square law of redial dilution is found to be valid for single- as well as multi-component systems. Diagrams.

9244 The Residual-Fuel Problem. *Oil and Gas Journal*, v. 52, Mar. 22, 1954, p. 138 + 39 pages.

Includes "The Fuel-Oil Situation", "Production of Asphalt", "Petroleum Coke", George Weber; "Furfural Refining of Cat Cycle Gas Oils", R. T. Carter; "What Makes a Good Cat Cracker Feed Stock", E. C. Oden and J. J. Perry; "Visbreaking—Basic Process for Fuel Reduction", M. G. Boone and D. F. Ferguson; "Residuals in Steam Boiler Service", O. F. Campbell; "There's Profit in Coking Synthetic Residua", John L. Chadwick; and "High-Viscosity Thermal Tar as Refinery Fuel", George Weber. Graphs, photographs, tables. 24 ref.

9244a More From the Bottom of the Barrel. *Oil and Gas Journal*, v. 52, Mar. 22, 1954, p. 123-137.

Methods of converting residual crude-oil fraction to light and middle distillates. Diagrams, tables.

9245 HF Alkylation. The Process and Its Control. J. E. Hewson. *Oil and Gas Journal*, v. 52, Mar. 22, 1954, p. 189 + 8 pages.

Union of an olefin with an aromatic, cyclic, or paraffinic hydrocarbon. Photographs, diagrams.

9246 Unifining. A New Petroleum Process. H. W. Grote, C. H. Watkins, H. F. Poll, and G. W. Hendricks. *Oil and Gas Journal*, v. 52, Apr. 19, 1954, p. 211-216.

Technique permits economic improvement of product quality by hydrogenation over catalysts containing Co and Mo, resulting in nearly complete removal of S, N, and metals. Photograph, tables, diagram.

9247 N.G.A.A.-C.N.G.A. Tray Design Forum. *Oil and Gas Journal*, v. 52, Apr. 26, 1954, p. 152 + 25 pages.

Includes "Bubble Caps", R. M. Young; "Perforated Plates", D. C. Lee; "Recycling Tray", E. G. Ragatz; "Shell Hurbogrid", J. A. Samaniego; "Float-Value Bubble Trays", I. E. Nutter; "Socony Uniflux", V. O. Bowles; "Gulf Perforated Plate", A. C. Eld; and "Koch Kaskade Flexitray", G. C. Thrift. Diagrams, graphs, photographs, tables. 6 ref.

9248 Improve Fluid Cat Cracker Operation. *Oil and Gas Journal*, v. 52, May 3, 1954, p. 86-93.

Tests for determination of activity and particle-size distribution of catalysts. Diagrams, graphs, tables.

9249 Hydrogen Cyanide. II. Acrylates, Methacrylates and Adiponitrile. Peter W. Sherwood. *Petroleum Processing*, v. 9, Apr. 1954, p. 548-553.

Manufacturing methods and petrochemical uses. Diagram. 14 ref.

9250 Removing Oil From Water by Flocculation and Filtration. V. J. Calise. *Power Engineering*, v. 58, Apr. 1954, p. 86-87, 110, 138.

Treatment of surface water supplies, condensate, and feedwater make-up for removal of oil is considered as problem for sludging, settling, and filtering. Tables, diagrams.

9251* Techniques of Fractionating Liquids in the Analysis of Petroleum Products. (French.) A. Crozier. *Revue de l'institut francais du petrole et Annales des combustibles liquides*, v. 9, no. 2, Feb. 1954, p. 42-50.

A review of fractional distillation, adsorption, crystallization, and thermal diffusion. Diagram, tables. 108 ref.

9252* Review of the Catalytic Cracking Process. VI. (Italian.) *Rivista dei Combustibili*, v. 8, no. 1, Jan. 1954, p. 45-60.

Fluid catalytic cracking; its various processes. Table, diagrams. (To be continued.)

9253* Desulfurization of Petroleum Fractions by Means of Hydrogenation. P. W. Sherwood. *Rivista dei Combustibili*, v. 8, no. 1, Jan. 1954, p. 61-66.

Hydrosulfurization in liquid and vapor phases.

9254 Heat Transfer, Diffusion, and Evaporation. Wilhelm Nusselt. *U. S. National Advisory Committee for Aeronautics, Technical Memorandum* 1367, Mar. 1954, 37 p. (TL570 Un3tm)

More accurate equations substituted for those used in previous investigations of relation between quantity of matter exchanged by diffusion and quantity of heat transferred by conduction. Diagrams, table. 20 ref.

9255* Interaction of Gases and Liquids by Foam Method. (Russian.) M. E. Pozin, I. P. Mulkhlenov, E. S. Tumarkina, and E. Ia. Tarat. *Zhurnal Prikladnoi Khimii*, v. 27, no. 1, Jan. 1954, p. 12-21.

Efficiency of single- and multiple-tray foam reaction towers. Diagrams, graph. 12 ref.

Books and Miscellaneous Publications

9256 Annual Report on Alkali Etc. Works. Great Britain Ministry of Housing and Local Government. v. 89. 74 p. 1952. Her Majesty's Stationery Office, London. (TD884 G79.3a)

Atmospheric pollution from chemical plants and spoilbanks.

See also:

9166 (refractories in refining cracking units)
9315 (high pressure alkylation)
9449 (treatment of water in steel mills)
9632 (production of chemicals from refinery coke)
9666 (coal as a chemical raw material)
9719 (purification of sea water)
10328 (operations research in oil industry)
10539 (ClO_2 generation)

CHEMISTRY—ANALYTICAL AND INORGANIC

9257 The Preparation and Structure of Magnesium Boride MgB_2. Morton E. Jones and Richard E. Marsh. *American Chemical Society, Journal*, v. 76, Mar. 5, 1954, p. 1434-1436.

Metallic Mg and boric oxide heated in atmosphere of H,

produce on acid hydrolysis, small quantities of boron hydrides, principally B_4H_{10}. Tables. 12 ref.

9258 Alkali Metal-Nickel Oxides of the Type $MNiO_2$. Lawrence D. Dyer, Bernard S. Borie, Jr., and G. Pedro Smith. *American Chemical Society, Journal*, v. 76, Mar. 20, 1954, p. 1499-1503.

Preparation and properties of two new compounds of trivalent Ni. Tables, diagram. 9 ref.

9259 Determination of Oxygen in Titanium and Zirconium by the Isotopic Method. A. D. Kirshenbaum, R. A. Mossman, and A. V. Grosse. *American Society for Metals, Transactions*, v. 46, 1954, p. 525-533; disc., p. 533-539.

Using O^{18} as a tracer does not require quantitative separation or recovery of O, thus giving accurate results. Accurate O values were obtained by this method in range of 0.2 to 26%. Diagram, tables. 14 ref.

9260 Determination of Hydrocarbon Classes by Chromatography With Visual and Fluorescent Indicators. P. G. Harvey and R. M. Pearson. *Analyst*, v. 79, Mar. 1954, p. 158-163.

Includes diagram, tables. 6 ref.

9261 High-Frequency Titrations With a Resistance-Type Instrument. Kunio Nakano, Reinosuke Hara, and Kensuke Yashiro. *Analytical Chemistry*, v. 26, Apr. 1954, p. 636-638.

Results of studies show extremely good reproducibility and sensitivity, for acid-base titrations. Design, operation, and applications. Diagrams. 5 ref.

9262* The Determination of Low Concentrations of Oxygen in Gases by the Manganous Hydroxide Method. (English.) H. A. C. van Straten. *Analytica Chimica Acta*, v. 10, no. 3, Mar. 1954, p. 243-255.

Includes tables, diagrams. 12 ref.

9263 Automatic Spectrophotometric Titrations. Determination of Milligram Quantities of Thorium. H. V. Malmstadt and E. C. Gohrbandt. *Analytical Chemistry*, v. 26, Mar. 1954, p. 442-445.

Apparatus, reagents, and techniques. Diagram, graphs, table. 12 ref.

9264 Quantitative Analysis of Organic Nitrogen by Flame Spectroscopy. Minoru Honma and C. Lothrop Smith. *Analytical Chemistry*, v. 26, Mar. 1954, p. 459-462.

Includes tables, graphs, spectrogram. 18 ref.

9265 Acoustic Apparatus for Determination of Mixture Ratio by Analysis of Engine Exhaust Gas. E. F. Weller. *Analytical Chemistry*, v. 26, Mar. 1954, p. 488-491.

Includes graphs, photographs, diagrams. 5 ref.

9266 Behavior of the Condensed Phosphate in Anion-Exchange Chromatography. John Beukenkamp, William Rieman, III, and Siegfried Lindenbaum. *Analytical Chemistry*, v. 26, Mar. 1954, p. 505-512.

Equations describe elution graphs of various phosphoric acids as functions of pH and concentration of eluant solutions. Graphs, tables. 14 ref.

9267 Evaluation of Twenty Qualitative Tests for Petroleum Sulfur Compounds. Clarence Karr, Jr. *Analytical Chemistry*, v. 26, Mar. 1954, p. 528-536.

Includes tables. 25 ref.

9268 Separation and Microscopic Identification of Gallium in the Presence of Aluminum. Aaron Wold, James H. Baird, and Charles R. Hough. *Analytical Chemistry*, v. 26, Mar. 1954, p. 546-548.

Includes micrographs, tables. 7 ref.

9269* Determination of Arsenic and Germanium After Their Separation by Distribution. (German.) Werner Fischer, Wilhelm Harre, Werner Freese, and Karl-Gerhard Hackstein. *Angewandte Chemie*, v. 66, no. 6, Mar. 21, 1954, p. 165-170.

Extracted from conc. HCl soln. by CCl_4 and similar solvents. Graph, tables. 21 ref.

9270* Spectrophotometric Analysis. C. L. Luke. *Bell Laboratories Record*, v. 32, Mar. 1954, p. 88-91.

Apparatus uses photoelectric cells. Photographs, diagram.

9271* Quantitative Determination of Keto-Acids by Paper Partition Chromatography. (English.) D. Cavallini and N. Frontali. *Biochimica et Biophysica Acta*, v. 13, no. 3, Mar. 1954, p. 439-445.

Sensitivity and accuracy of quantitative determination of pyruvic and α-keto-glutaric acid in biological material. Tables, graphs, diagram. 8 ref.

9272 Determination of Reduced Titanium in Titaniferous Blast Furnace Slags. E. M. Chernomordik. *Henry Brutcher, Altadena, Calif., Translation no.* 3123, 5 p. (From *Zavodskaya Laboratoriya*, v. 11, no. 9, 1945, p. 800-802.)

Preliminary experiments and results. Tables.

9273 The Chromatography of Gases and Vapours. III. The Determination of Adsorption Isotherms. D. H. James and C. S. G. Phillips. *Chemical Society, Journal*, 1954, Mar., p. 1066-1070.

Isotherms of benzene and *cyclo*hexane were determined on charcoal at 77 and 110 C. Diagrams, tables, graphs.

9274* Polarographic Measurement of Red Lead. (German.) J. Baltes and P. Wiertz. *Fette, Seifen, Anstrichmittel*, v. 56, no. 2, Feb. 1954, p. 84-88.

Method enables quick determination of various oxides and impurities. Tables, graphs.

9275* Circular Paper Chromatography. VIII. Separation, Identification and Quantitative Estimation of Sugars and Oligosaccharides. K. V. Giri and V. N. Nigam. *Indian Institute of Science, Journal*, v. 36, sec. A, Jan. 1954, p. 49-63 + 4 plates.

Multiple development resolution of sugars. Tables, chromatograms. 43 ref.

9276* Studies in the Polargraphic Behaviour of γ-Benzene Hexachloride. U. Sanjiva, R. S. Subrahmanya, and M. R. A. Rao. *Indian Institute of Science, Journal*, v. 36, sec. A, Jan. 1954, p. 36-48 + 3 plates.

Quantitative estimation of γ-isomer using dioxane, alcohol, and acetone solvents; and LiCl and sodium acetate electrolyte. Tables. 25 ref.

9277 Toward a System of Zirconium Chemistry. Warren B. Blumenthal. *Industrial and Engineering Chemistry*, v. 46, Mar. 1954, p. 528-539.

Discusses Zr, its compounds, and their properties with emphasis on electrochemistry. Photograph. 67 ref.

9278 Experiments in Paper Partition Chromatography With Tagged Material. Fausto W. Lima. *Journal of Chemical Education*, v. 31, Mar. 1954, p. 153-156.

Includes diagram, graph. 13 ref.

9279* Analysis of Inorganic Compounds by Paper Chromatography. II. The Separation and Detection of Mercury, Silver, and Lead. (English.) Swarup Narain Tewari. *Kolloid-Zeitschrift*, v. 135, no. 3, Mar. 1954, p. 159-160.

Includes tables. 7 ref.

9280* List of Microchemical Publications. 1939-1949. (English and German.) Rolf Steinmann. *Mikrochimica Acta*, 1953, nos. 5-6, p. 449-642.

Continuation of the "Literaturnachweis mikrochemischer Arbiten" first published in 1937 as supplement to v. 22, of "Mikrochemie" and v. 1, of "Mikrochimica Acta".

9281* Microanalysis of Germanium. (German.) Gertrude Bartelmus and Friedrich Hecht. *Mikrochimica Acta*, 1954, no. 1, p. 148-162.

Use of thioacetamide in place of H_2S for precipitation of GeS_2. Tables, diagram. 15 ref.

9282 The Polarographic Analysis of Nickel Plating Solutions. J. V. Petrocelli and G. Tatoian. *Plating*, v. 41, Mar. 1954, p. 262-268.

Polarographic methods; their potentialities in study and control of plating solutions. Graphs, diagram, photograph, tables. 9 ref.

Chemistry—Analytical and Inorganic

9283* The Application of the Hollow Cathode Source to Spectrographic Analysis. (English.) F. T. Birks. *Spectrochimica Acta*, v. 6, no. 2, Feb. 1954, p. 169-179.

Construction and operation of cathode; its attendant rare gas circulation system. Diagrams, graphs, tables. 31 ref.

9284* The Potentiometric Determination of Bivalent Iron With Trivalent Potassium Hexacyanoferrate. (German.) G. Wittmann. *Zeitschrift für analytische Chemie*, v. 141, no. 4, 1954, p. 241-246.

Method of titrating Fe which does not respond to trivalent As. Can be used in presence of Zn, Cu, Pb, Mn, Co, Ni, Cd, and Sb. Graphs, tables. 4 ref.

9285* Photometric Determination of Copper as Sulfate. (German.) Walter Nielsch and Gerhard Böltz. *Zeitschrift für analytische Chemie*, v. 141, no. 5, 1954, p. 321-326.

Simple and rapid method based on observations of permeability measurements with spectral photometer. Graphs, tables. 4 ref.

9286* Chemistry of Germanium. II. On Germanium Monochloride and Digermanium Hexachloride. (German.) Robert Schwarz and Egon Baranetzky. *Zeitschrift für anorganische und allgemeine Chemie*, v. 275, nos. 1-3, Feb. 1954, p. 1-20.

Preparation of GeCl; chemical and thermal behavior; its crystalline and amorphous modification. Preparation, analysis, and properties of Ge_2Cl_6. Diagrams, tables, graphs. 27 ref.

Books and Miscellaneous Publications

9287 Comprehensive Inorganic Chemistry. M. Cannon Sneed, J. Lewis Maynard, and Robert C. Brasted. v. II. Copper, Silver, and Gold. J. W. Laist. 248 p. 1954. D. Van Nostrand Co., Inc., N. Y. (QD151 C73)

Covers minerals and ores; concentration, recovery, commercial metals and alloys; chemical properties; and most common compounds of Cu, Ag, and Au.

9288 Fluorescence Analysis in Ultra-Violet Light. J. A. Radley and Julius Grant. 4th Rev. Ed. 560 p. 1954. Chapman & Hall Ltd., London. (QC459 R11f)

Theory, technique, and applications.

9289 Proceedings of the International Congress on Analytical Chemistry, Oxford. Robert Robinson, editor. 493 p. 1952. W. Heffer & Sons, Ltd., Cambridge, England. (QD75 In8p)

Lectures, papers, and discussions contained in this volume are reprinted from *The Analyst*, 1952, v. 77, p. 557-1024.

9290 Quantitative Organic Analysis via Functional Groups. Sidney Siggia. 2nd Ed. 227 p. 1954. John Wiley & Sons, Inc. (QD101 Si23q2)

Working methods for determining organic compounds by the functional groups on the molecule.

See also:

9092 (chemistry of 2,4-D)
9674 (determination of benzene in coke-oven gas)
9683 (gravimetric gas analysis)
9779 (recording densitometer)
9979 (estimation of gases in cast iron)
10396 (absorption spectra of styrenes)

CHEMISTRY—ORGANIC

9291* Studies Related to Naturally Occurring Acetylene Compounds. XIII. The Occurrence of *trans*-Methyl-*n*-Dec-2-en-4 : 6 : 8-triyonate in the Genus *Tripleurospermum* Schultz Bipontinus. Jörgine Stene Sörensen, Torger Bruun, Dagny Holme, and Nils Andreas Sörensen. **VIV. The Occurrence of 2-*trans* : 8-*trans* Deca-2 : 8-diene-4 : 6-diyn-1-ol= *trans*: *trans*-Matricarianol in Nature.** (English.) Dagny Holme and Nils Andreas Sörensen. *Acta Chemica Scandinavica*, v. 8, no. 1, 1954, p. 26-41.

Includes ultra-violet absorption spectra, table. 21 ref.

9292 Studies on Structure of Sphingomyelin. III. Quantitative Data on the Peroxide and Periodate Utake During the Oxidation of Sphingomyelin. IV. Configuration of the Double Bond in Sphingomyelin and Related Lipids and a Study of Their Infrared Spectra. G. Marinetti and E. Stotz. *American Chemical Society, Journal*, v. 76, Mar. 1954, p. 1345-1352.

Experimental results. Spectrograms. 27 ref.

9293 Condensation of Hydroxyaromatic Compounds With Formaldehyde and Primary Aromatic Amines. W. J. Burke, K. C. Murdock, and Grace Ec. *American Chemical Society, Journal*, v. 76, Mar. 20, 1954, p. 1677-1679.

Includes table. 12 ref.

9294 The Reaction of *o*-Phenylenediamines With Carbonyl Compounds. II. Benzophenones and Dibenzyl Ketones. IV. The Primary Product From Dibenzyl Ketone. Robert C. Elderfield and Victor B. Meyer. *American Chemical Society, Journal*, v. 76, Apr. 5, 1954, p. 1883-1891.

Experimental studies. Ultra-violet and infra-red spectra. Table. 37 ref.

9295* Natural Dyewoods and Their Application. H. R. Tisdale. *American Dyestuff Reporter*, v. 43, Mar. 15, 1954, p. 157-159, 164.

Habitat, chemical nature, methods of manufacture, and processing; application to silk, wool, cotton, leather, nylon, acetate rayon, wood, hog bristles, and furs; and use in lakes, pigments, and rustproofing.

9296* Reactions of Fatty Materials With Oxygen. XV. Formation of 9.10-Dihydroxystearic Acid and Cleavage Products in the Oxidation of Oleic Acid and Methyl Oleate in Acetic Acid. H. B. Knight, E. F. Jordan, Jr., R. E. Koos, and Daniel Swern. *American Oil Chemists' Society, Journal*, v. 31, Mar. 1954, p. 93-96.

Includes tables. 13 ref.

9297* Reactions of Fatty Acid Chlorides. I. Preparation of Fatty Acid Anhydrides. N. O. V. Sonntag, J. R. Trowbridge, and I. J. Krems. *American Oil Chemists' Society, Journal*, v. 31, Apr. 1954, p. 151-157.

Anhydrides of decanoic, lauric, myristic, palmitic, stearic, and oleic acids prepared in better than 90% yields through corresponding acid chlorides with actic anhydride. Tables. 45 ref.

9298* Progress in Perfumery Materials. III. Paul Z. Bedoukian. *American Perfumer and Essential Oil Review*, v. 63, Apr. 1954, p. 267-270.

Essential oils from various sources, terpenes, and sesquiterpenes. Photographs. 104 ref.

9299* Cyanocobalamin (Vitamin B_{12}). I. A Study of the Stability of Cyanocobalamin and Ascorbic Acid in Liquid Formulations. Andrew Bartilucci and Noel E. Foss. *American Pharmaceutical Association, Journal, (Scientific Ed.)*, v. 43, Mar. 1954, p. 159-162.

Experimental studies. Tables. 18 ref.

9300* Influence of Molecular Structure of Organic Compounds on Their Distribution Between Two Liquid Phases. L. Alders. *Applied Scientific Research*, v. 4, sec. A, no. 3, 1954, p. 171-179.

Each series of homologous straight-chain organic compounds investigated the logarithm of coefficient of distribution between given solvent pair at infinite dilution is a linear function of number of C-atoms present in the alkyl group. Graphs, tables.

9301* Studies in the Field of Antitubercular Chemotherapy. II. Derivatives of Hydrazides, Monosubstituted Hydrazino-Esters, and Diacylhydrazines. (French.) M. D. Libermann. *Bulletin de la société chimique de France*, 1954, no. 2, Feb., p. 195-199.

Preparation of 13 compounds. 10 ref.

9302 The Silver Catalyzed Oxidation of Ethylene. I. Slow Processes on the Catalyst Surface. II. Kinetics of C_2H_4 Oxidation. III. Kinetics of Ethylene Oxide Oxidation. IV. Reaction Mechanism. A. Orzechowski and K. E.

MacCormack. *Canadian Journal of Chemistry*, v. 32, Apr. 1954, p. 388-398, 415-451.
Includes graphs, tables, diagrams. 25 ref.

9303 Di*iso*propylberyllium and Some Beryllium Hydrides. G. E. Coates and F. Glockling. *Chemical Society, Journal*, 1954, Jan., p. 22-27.
Includes diagrams.

9304 Some Products Formed From Phenolic Inhibitors During the Autoxidation of Cumene. R. F. Moore and William A. Waters. *Chemical Society, Journal*, 1954, Jan., p. 243-246.
Experimental studies.

9305 The Retardation of Benzaldehyde Autoxidation. VI. The Actions of a Number of Polycyclic Aromatic Hydrocarbons of Carcinogenic Interest. J. R. Dunn, William A. Waters, and Ivan M. Roitt. *Chemical Society, Journal*, 1954, Feb., p. 580-586.
Includes graphs, tables.

9306 Derivatives of Acetoacetic Acid. I. The Reaction of Diketen With 1:2- and 1:3-Ketols to Give γ- and σ-Lactones. II. The Rearrangement of 3-Acyl-2: 5-Dihydrofuran-2-One Derivatives to Furan-3-Carboxylic Acids. III. The Pyrolysis of Acetoacetates of Ethynylcarbinols. IV. A New Route to α-Acetyletetronic Acids. V. The Reaction of Diketen With Thioureas, Amidines, Guanidines, and S-Substituted Thioureas. VI. A Synthesis of 1:3-Oxazine Derivatives Employing Diketen. VII. α-Acetyltetramic Acids. VIII. The Synthesis of Coumarins From Aryl Acetoacetates. R. N. Lacey. *Chemical Society, Journal*, 1954, Mar. p. 816-860.
Includes tables.

9307* Silicone. XXI. Technical Applications of Silicic Acid Esters. (German.) M. Weist. *Chemische Technik*, v. 6, no. 2, Feb. 1954, p. 63-70.
Chemical properties; possible applications. Tables. 35 ref.

9308* Microstructure and Deformation Properties of Lignite Tars and Pitch. (German.) H. Walther. *Chemische Technik*, v. 6, no. 2, Feb. 1954, p. 91-97.
Basic differences in microstructure of bituminous substances; effect upon resistance to deformation; penetration and viscosity; and attempts at overcoming unfavorable properties. Micrographs, graphs, table.

9309* Separation of Fatty Acids and Its Physico-Chemical Foundation. (German.) R. Rigamonti. *Fette, Seifen, Anstrichmittel*, v. 56, no. 1, Jan. 1954, p. 1-8.
Fractional distillation and crystallization; chromatographic methods; and extraction with selective solvents. Graphs, diagrams, table. 37 ref.

9310* Infrared-Spectroscopy of Fats. (German.) J. Lecomte. *Fette, Seifen, Anstrichmittel*, v. 56, no. 1, Jan. 1954, p. 23-28.
Examples of practical application, analysis of fat-mixtures, and compositon of oils and butter fat. Graphs. 34 ref.

9311* Studies on Isolation of Single Components of Paraffin Oxidation. (German.) F. Runge and H. Laske. *Fette, Seifen, Anstrichmittel*, v. 56, no. 3, Mar. 1954, p. 145-149.
Attemps to separate branched from straight chain fatty acids by addition compounds of the latter with urea. Under certain conditions of fractional distillation isolation of fatty acids was possible. Diagrams, graphs, tables. 7 ref.

9312* Some Reactions at High Pressures Over 1,000 Atmospheres. (Japanese.) Shinjiro Kodama. *Fuel Society of Japan, Journal*, v. 33, no. 322, Feb. 1954, p. 70-81.
Explains polymerization, copolymerization, and telomerization of ethylene; reactions of CO with H_2O, aliphatic hydrocarbons, unsaturated compounds, alcohols, ketones, and nitrogenous compounds; and Reppe reactions.

9313* Thiophenes and Thiapyrans. XII. Synthesis of Thiophthenes. V. V. Ghaisas and B. D. Tilak. *Indian Academy of Sciences, Proceedings*, v. 39, sec. A, Jan. 1954, p. 14-19.
Details of preparing solutions. 15 ref.

9314 Synthesis of Ethylene Chlorohydrin. William G. Domask and Kenneth A. Kobe. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 680-689.
Effect of several process variables on yields; compares recycle and single column operation. Diagrams, photographs, tables, graphs. 16 ref.

9315 High Pressure Alkylation of Isobutane With Propylene. James E. Knap, E. W. Comings, and H. G. Drickamer. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 708-713.
Includes photographs, diagram, tables, graphs. 29 ref.

9316 Reactions of Nitroparaffins. III. Derivatives of 3-Methyl-3-Nitro-1,2-Butanedicarboxylic Acid. Philip S. Magee and Milton C. Kloetzel. *Journal of Organic Chemistry*, v. 19, Feb. 1954, p. 168-175.
Includes table, spectrograms. 3 ref.

9317 Reactions of Halogens With Arylsulfonates. II. Iodination *Via* Iodine and Silver 2-Naphthalenesulfonate. L. H. Klemm and Paul F. Silva. *Journal of Organic Chemistry*, v. 19, Feb. 1954, p. 202-212.
Apparatus, techniques, and results of experimental studies. Tables, spectrograms. 26 ref.

9318 The Nitration of Weakly Basic Secondary Amines. R. H. Meen and George F. Wright. *Journal of Organic Chemistry*, v. 19, Mar. 1954, p. 391-402.
Includes tables, graphs. 26 ref.

9319* The Synthesis of Adrenocortical Hormones. II. Partial Syntheses From Naturally-Occurring Steroids. C. A. Finch. *Manufacturing Chemist*, v. 25, Mar. 1954, p. 100-106.
Includes charts, photograph. 59 ref.

9320* Lilac Perfumes. V. Vasic. *Manufacturing Chemist*, v. 25, Apr. 1954, p. 146-147, 157.
Great variety of compositions created by skillfully employing wide range of bases, blenders, modifiers, fixers, florals, and aldehydes. Hints on preparation of lilac perfumes; eight formulas as basis for experimentation. Table. 11 ref.

9321* Organic Compounds of Sulphur. Frederick Challenger. *Manufacturing Chemist*, v. 25, Apr. 1954, p. 151-157.
Review of recent research. 39 ref.

9322 Epoxidation-Hydroxylation Reactions. Frank P. Greenspair. *Modern Plastics*, v. 31, Mar. 1954, p. 123, 202, 204.
Mechanism of reactions. 10 ref.

9323 Petrochemical Reactions. X. Halogenation of Olefins. Lewis F. Hatch. *Petroleum Refiner*, v. 33, Mar. 1954, p. 175-177.
Includes diagrams. (To be continued.)

9324 Studies on the Biochemical Mechanism of Fatty Acid Oxidation and Synthesis. E. R. Stadtman. *Record of Chemical Progress*, v. 15, no. 1, 1954, p. 1-17.
Bacterium *Clostridium kluyveri* produces short chain fatty acids anaerobically from actetic acid and ethanol. Diagrams. 17 ref.

9325 On the Thermal Decompositon of the Lower Paraffin Hydrocarbons of Paraffin-Olefine-Hydrogen Equilibrium Mixtures, and of Similar Compounds and Systems. M. W. Travers and C. G. Silcocks. *Royal Society, Proceedings*, v. 222, ser. A, Mar. 9, 1954, p. 143-166.
Changes followed by chemical analysis, take into account all products whether gaseous or non-gaseous at normal temperature. Results suggest rupture of a paraffin chain is a secondary process involving ethylenic linkages. Tables, graphs. 18 ref.

9326* Newer Fatty Acid Uses. E. McCauliff. *Soap and Sanitary Chemicals*, v. 30, Mar. 1954, p. 51-53, 114.
New, novel purity of many fatty acids, plus willingness of chemical manufacturers to view them as chemical building blocks.

9327* Toxicity of Soaps and Detergents. Louis C. Barail. *Soap and Sanitary Chemicals*, v. 30, Apr. 1954, p. 52-55.
Primary irritation of the skin and mucous membranes and cutaneuos sensitization.

Chemistry—Organic

9328* New Process of Preparing SiH_3Cl and SiH_2Cl_2. (German.) Oskar Glemser and Wolfgang Lohmann. *Zeitschrift für anorganische und allgemeine Chemie*, v. 275, nos. 4-5, Mar. 1954, p. 260-266.

Chlorosilanes are intermediate products in production of organic Si compounds when made by reacting $SiCl_4$ with CH_2O using γ-Al_2O_3 as catalyst. Diagram, tables. 16 ref.

Books and Miscellaneous Publications

9329* Classified Bibliography of Publications Concerning Fluorine and Its Compounds in Relation to Man, Animals, and Their Environment Including Effects on Plants. Pt. II. Organic Fluorine Compounds. Irene R. Campbell, compiler. 464 p. 1954. Dept. of Preventive Medicine and Industrial Health, College of Medicine, Univ. of Cincinnati, Cincinnati. (ZQD412.F1 C15c)

A total of 1101 informative abstracts. Author and subject indexes.

9330 Progress in the Chemistry of Organic Natural Products. (German, English, French.) L. Zechmeister, editor. v. X. 529 p. 1953. Springer Verlag, Vienna. (QD245 F77c)

Includes "Application of the Diene Synthesis for the Investigation of Natural Materials", Kurt Alder and Marianne Schumacher; "Physical Chemistry of Rubbers", H. Mark; "Chemistry of Bacterial Lipids", J. Asselineau and E. Lederer; "Synthesis of Cortisone", G. Rosenkranz and F. Sondheimer; "Ranwolfia Alkaloids", Asima Chatterjee (nee Mookerjee); and "Insecticides Occurring in Higher Plants", L. Feinstein and M. Jacobson.

9331 The Chemistry of Chelate Compounds. A Symposium. 75 p. 1954. Dept. of Chemistry, Polytechnic Inst. of Brooklyn. (QD411 P76c)

Includes "Chelate Compounds: Results of Stereochemical Studies", Fred Basolo; "Chelate Compounds: Potentiometric and Spectrophotometric Methods of Investigation", C. F. Hiskey; "Chelate Compounds: Results of Exchange Studies", A. W. Adamson; "Chelate Molecular Architecture", Melvin Calvin; "Chelate Compounds: General Trends in Their Stability", Legrand G. Van Uitert and W. Conard Fernelius; "Formation Constants of Metal Derivatives of Iminodiacetic Acids and Related Compounds", J. K. Suder; "Relative Stabilities of Metal Derivatives of *o*-Substituted Aryl AZO Compounds", A. Snavely; "Formation Constants of Complex Ions Resulting From the Coordination of Ammonia and Amines With Metal Ions", B. Peter Block; and "Complexes of Trapolone and Its Derivatives'", Burl E. Bryant.

See also:

9115 (synergism)
9150 (path of carbon in photosynthesis)
9153 (enzyme-catalyzed reactions)
9226 (etxractive crystallization with urea)
9275 (identification of sugars)
9290 (quantative organic analysis)
9354 (thermal conductivity of organic vapors)
9479 (stability of transformer oil)
10480 (preservation for animal glues)

CHEMISTRY—PHYSICAL

9332 On the Energies of Alkali Halide Solid Solutions. (English.) Väinö Hovi. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 334-339.

Heats of formation and evolution calculated on basis of Wasastjerna's statistical theory for solutions in which difference between interionic equilibrium distances of components is equal to or smaller than case of NaCl-NaBr. Tables, graphs. 41 ref.

9333 Determination of Activity Coefficients by Ultracentrifugation. Ultracentrifugation of Uranyl Fluoride Solutions. James S. Johnson, Kurt A. Kraus, and T. Fraser Young. *American Chemical Society, Journal*, v. 76, Mar. 5, 1954, p. 1436-1443.

Includes graphs, table. 22 ref.

9334 The AlI_3-HCl-$AlCl_3$-HI System. The Free Energy of Formation of Aluminum Iodide. J. D. Corbett and N. W. Gregory. *American Chemical Society, Journal*, v. 76, Mar. 5, 1954, p. 1446-1447.

Experimental study. Tables. 10 ref.

9335 The Electrical Conductivity of Uranyl Sulfate in Aqueous Solution. Robert D. Brown, W. B. Bunger, William L. Marshall, and C. H. Secoy. *American Chemical Society, Journal*, v. 76, Mar. 20, 1954, p. 1532-1535.

Includes tables, graphs. 11 ref.

9336 Studies on Ion Exchange Resins. IX. Capacity and Specific Volumes of Quaternary Base Anion Exchange Resins. Harry P. Gregor, Jack Belle, and R. A. Marcus. *American Chemical Society, Journal*, v. 76, Apr. 5, 1954, p. 1984-1987.

Capacities, wet weights, and volumes of quaternary ammonium resins, in a number of univalent anionic states including halide, strong mineral acid anion, hydroxide, chloro-substituted acetate, and benzene plus naphthalene sulfonate states, were measured. Graphs, table. 12 ref.

9337* Pressure-Volume-Temperature Relations in CO_2 at Elevated Temperatures and Pressures. George C. Kennedy. *American Journal of Science*, v. 252, Apr. 1954, p. 225-235.

Equipment, techniques, and results of experimental measurements. Graphs, diagrams, table. 10 ref.

9338* The Behaviour of Fluids of Quasi-Spherical Molecules. I. Gases at Low Densities. II. High Density Gases and Liquids. S. D. Hamann and J. A. Lambert. *Australian Journal of Chemistry*, v. 7, Feb. 1954, p. 1-27.

Includes tables, graphs. 35 ref.

9339* Some Properties of Gas Mixtures. A. M. Godridge. *British Coal Utilization Research Association, Monthly Bulletin*, v. 18, Jan. 1954, p. 1-21.

Theory, experimental methods, and published literature on specific heats, viscosities, and thermal conductivities of N, O, H, CO, CO_2, CH_4, water vapor (steam), and air. Tables. 136 ref.

9340* The Constitution of Basic Metallic Ions. (French.) Jacques Faucherre. *Bulletin de la société chimique de France*, 1954, no. 2, Feb., p. 253-267.

Studies of the perchlorates and nitrates of Ag^+, Pb^{+2}, UO_2^{+2}, Be^{+2}, Bi^{+3}, Sb^{+3}, Al^{+3}, Cr^{+3}, and Th^{+4}. Table, graphs. 122 ref.

9341 The Ortho-Para Conversion of Hydrogen and Deuterium on Inhomogeneous Paramagnetic Surfaces. Y. L. Sandler. *Canadian Journal of Chemistry*, v. 32, Mar. 1954, p. 249-260.

Experiments over a wide temperature range in a static system. Graphs, table. 14 ref.

9342 The Kinetics of the Pyrolysis of Toluene. H. Blades, A. T. Blades, and E. W. R. Steacie. *Canadian Journal of Chemistry*, v. 32, Mar. 1954, p. 298-311.

Experimental studies. Diagram, graphs, tables. 3 ref.

9343 Chemical Bonds Involving d-Orbitals. I-II. D. P. Craig, A. Maccoll, R. S. Nyholm, L. E. Orgel, and L. E. Sutton. *Chemical Society, Journal*, 1954, Jan., p. 332-357.

Includes diagrams, graphs, tables.

9344 The Influence of Uranyl and Thorium Salts on the Miscibility of Phenol and Water. S. T. Bowden and J. H. Purnell. *Chemical Society, Journal*, 1954, Feb., p. 535-538.

Experimental studies. Tables, graph.

9345 Adsorption of Ions by Carborundum. G. A. H. Elton and J. W. Mitchell. *Chemical Society, Journal*, 1954, Feb., p. 741-744.

Measurements of extent of adsorption made conductometrically. Results used to calculate energies of adsroption of individual ions. Graph, tables.

9346* Study of Structure of Copper Catalysts Used in the Synthesis of Methylchlorosilanes. (French.) Boris Imelik,

and Pierre Trambouze. *Comptes rendus*, v. 238, no. 6, Feb. 8, 1954, p. 680-682.
6 ref.

9347* The Effect of Ultrasonic Oscillations on Heterogeneous Processes Taking Place in the Diffusion Region. (Russian.) N. N. Dolgopolov and V. M. Fridman. *Doklady Akademii Nauk SSSR*, v. 93, no. 1, Nov. 1, 1953, p. 93-95.
Ultrasonic oscillations of sufficient power accelerate heterogeneous processes with no significant change in kinetics. Diagram, graph, tables.

9348* The Nonequivalence of Lengths of the Metal-Oxygen Bonds in Certain Metal Oxides and the "Molecular" Structure of ZnO. (Russian.) G. S. Zhdanov and V. A. Pospelov. *Doklady Akademii Nauk SSSR*, v. 93, no. 1, Nov. 1, 1953, p. 97-99.
X-ray investigations of metal-oxide structures show noticeable differences in interatomic distances within the limits of the same coordination polyhedron. Graphs. 9 ref.

9349* Adsorption of Triethylamine From Vapors and From Solutions on Silica Gels of Varied Structure. (Russian.) A. V. Kiselev and V. V. Kulichenko. *Ooklady Akademii Nauk SSSR*, v. 93, no. 1, Nov. 1, 1953, p. 101-104.
Isotherms from solutions in heptane and water. Tables, graphs. 17 ref.

9350* Mechanism of the Exchange of Hydrogen Isotopes in Solution. (Russian.) A. I. Brodskii. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1954, p. 847-850.
Conditions causing fast and slow exchange. Two basic types of slow exchange distinguished, depend on ratio of rate of exchange to rate of electrolytic dissociation. Survey of previous work. 20 ref.

9351 Effect of Chain Branching on Electrochemical Carbon-Halogen Bond Fission. Possible Mechanism for the Process. Philip J. Elving, Joseph M. Markowitz and Isadore Rosenthal. *Electrochemical Society, Journal*, v. 101, Apr. 1954, p. 195-202.
Results of polarographic studies. Tables, graph. 36 ref.

9352 Cathode Effects in the Dielectric Breakdown of Liquids. J. K. Bragg, A. H. Sharbaugh, and R. W. Crowe. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 382-391.
Emission of electrons and formation of space charge influenced by nature of cathode metal. Graphs, diagrams, table. 13 ref.

9353 Adsorption Studies on Clay Minerals. IV. The System Montmorillonite-Cesium-Potassium. Joseph A. Faucher and Henry C. Thomas. *Journal of Chemical Physics*, v. 22, Feb. 1954, p. 258-261.
Ion-exchange equilibria studied by chromatographic and other methods. Results summarized in terms of equilibrium constants and activity coefficients for mixed clay phase. Tables, graphs. 9 ref.

9354 The Thermal Conductivity of Organic Vapors. The Relationship Between Thermal Conductivity and Viscosity, and the Significance of the Eucken Factor. R. G. Vines and L. A. Bennett. *Journal of Chemical Physics*, v. 22, Mar. 1954, p. 360-366.
Thermal conductivities of 31 polar and non-polar organic vapors determined at pressures up to one atmosphere, over a temperature range from 40 to 160 C. Tables, graphs, diagram. 25 ref.

9355 Exchange Energy of Electrons in Metals and Ionic Crystals. John R. Reitz. *Journal of Chemical Physics*, v. 22, Apr. 1954, p. 595-598.
Energy of valence electrons in monatomic and diatomic crystals is computed in Bloch approximation for case where lowest electronic wave function in band shows considerable spatial variation. Graph. 11 ref.

9356 Carbon-13 Isotope Effect in the Thermodecomposition of Nickel Carbonyl. Richard B. Bernstein. *Journal of Chemical Physics*, v. 22, Apr. 1954, p. 710-713.
Fractionation factor was measured from 30-105 C, using samples of normal isotope abundance. Graph, tables, diagram. 8 ref.

9357 The Vapor Pressure of Beryllium Fluoride. K. A. Sense, M. J. Snyder, and J. W. Clegg. *Journal of Physical Chemistry*, v. 58, Mar. 1954, p. 223-224.
Vapor pressures measured over temperature range 746-968 C by use of transpiration method. Extrapolated boiling point shown to be 1159 C; melting point about 803 C. Diagram, table. 8 ref.

9358 The Stability of SiO Solid and Gas. Leo Brewer and Russell K. Edwards. *Journal of Physical Chemistry*, v. 58, Apr. 1954, p. 351-358.
Properties, thermodynamic stability, and chemical behavior. Tables, diagrams. 38 ref.

9359* Determining the Surface Size of Fine Powders. (German.) Erhard Landt. *Kolloid-Zeitschrift*, v. 135, no. 2, Feb. 1954, p. 91-96.
Theoretical explanation of absolute method of determining specific surface of non-porous powders by determining heat of wetting and adsorption or by the entropy method. Table. 19 ref.

9360* Adsorption and Capillary Condensation on Activated Carbon. (German.) Paul Kukelka. *Kolloid Zeitschrift*, v. 135, no. 2, Feb. 1954, p. 96-101.
Adsorption of vapors by activated C occurs primarily by capillary condensation. Adsorption plays significant role only at very low pressures. Diagram, tables. 9 ref.

9361* The Temperature Coefficient of the Viscosity of Liquids. (German.) E. Baum. *Kolloid-Zeitschrift*, v. 135, no. 3, Mar. 1954, p. 176-182.
Universal equation derived for determination of viscosity applicable to all previously investigated liquids. Graph, tables. 1 ref.

9362 Some Relations for Crystals With Substructures. M. J. Buerger. *National Academy of Sciences of the United States of America, Proceedings*, v. 40, Feb. 1954, p. 125-128.
Presence of sub-structure gives rise to specialized X-ray diffraction effects. Patterson map and reciprocal lattice have specialized features which may be recognized. Diagrams. 6 ref.

9363 Photochemical Transformation of F-Centers in KCl Crystals at High Temperatures. A. A. Shatalov. *National Science Foundation Translation*, no. 198, Feb. 1954, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 92, no. 3, Sept. 21, 1953, p. 549-552.)
Previously abstrated from original. See item 7725, v. 3, June, 1954.

9364* Ionization by Strong Electrical Fields. (German.) F. Kirchner. *Naturwissenschaften*, v. 41, no. 6, 1954, p. 136-137.
Study of adsorption of gases on metal surfaces reveals spontaneous ionization of adsorbed atoms and emission of electrons from adsorbed gas film. Graphs, micrograph. 10 ref.

9365 Ethylbenzene. Dwight S. Hoffman and James H. Weber. *Petroleum Processing*, v. 9, Apr. 1954, p. 545-547.
Temperature-enthalpy data for ethylbenzene from 280 to 1280 F and 14.7 to 560.1 psi. a. Graph, table. 21 ref.

9366 Isotherms and Thermodynamical Functions of Ethane at Temperatures Between 0°C and 150°C and Pressures up to 200 Atm. (English.) A. Michels, W. Van Straaten, and J. Dawson. *Physica*, v. 20, no. 1, Jan. 1954, p. 17-23.
Includes tables. 6 ref.

9367 The Superconductivity of Some Transition Metal Compounds. George F. Hardy and John K. Hulm. *Physical Review*, v. 93, ser. 2, Mar. 1, 1954, p. 1004-1016.
Eighty transition metal compounds comprising borides, carbides, nitrides, oxides, silicides, and germanides of metals of Groups 4A, 5A, and 6A were tested for super-conductivity down to 1.20 K using a magnetic method. Tables, graphs, diagram. 66 ref.

9368 The Role of Light Quanta in the Electric Breakdown of Gases. W. L. Harries and A. von Engel. *Royal So-*

Chemistry—Physical

ciety, Proceedings, v. 222, ser. A, Mar. 23, 1954, p. 490-508.

Idea that multiplication of electrons by direct collisions with gas atoms accounts for starting of discharges was found to be untenable in neon over a wide range of pressure and wavelengths. Graphs, table. 29 ref.

9369* Determination of Melts and Classification of Solids Into "Volume Weak" and "Volume Strong" Solids at High Temperatures. (German.) A. Knappwost and H. Restle. *Zeitschrift für Elektrochemie*, v. 58, no. 2, 1954, p. 112-118.

Definition of terms. Observations of solidification phenomena of various materials. Graphs, diagrams, table, photograph. 10 ref.

9370* Statistics of Ideal Mixtures With Consideration of Space Requirements of Particles. (German.) Reinhard Schlögl. *Zeitschrift für physikalische Chemie*, v. 202, nos. 5-6, Jan. 1954, p. 379-389.

Relationship between thermodynamic and statistically derived equilibrium conditions. Diagrams, graph. 8 ref.

9371* Thermal and Mechanical Behavior of Amorphous Solids as Result of Molecular Transpositions. (German.) W. Holzmüller. *Zeitschrift für physikalische Chemie*, v. 202, nos. 5-6, Jan. 1954, p. 440-459.

Softening of amorphous solids; melting of and thermal effect on tensile strength and plastic flow; and thermal conductivity crystals, glasses, and resins. Graphs. 15 ref.

9372* Oxidation of Ethylene and Ethylene Oxides on Oxide Catalysts and Silver. (Russian.) O. M. Todes and T. I. Andrianova. *Zhurnal Fizicheskoi Khimii*, v. 27, no. 10, Oct. 1953, p. 1485-1489.

Mg-Cr and Cu-Cr applied on asbestos were used as oxide catalysts. Graphs. 4 ref.

9373* Investigation of the Catalytic Process in a Solution and Obtaining a New Intermediate Product. (Russian.) G. A. Bogdanov and A. I. Pastukhova. *Zhurnal Fizicheskoi Khimii*, v. 27, no. 10, Oct. 1953, p. 1556-1563.

Joint reaction of $NiSO_4$ and Na_2WO_4 on H_2O_2 decomposition under various conditions of pH, temperature, substrate concentration, and catalysts. Graphs, table. 13 ref.

9374* Catalysts in Decomposition of Hydrogen Peroxide. (Russian.) G. M. Zhabrova, S. Z. Roginskii, and E. A. Fokina. *Zhurnal Obshchei Khimii*, v. 24, no. 1, Jan. 1954, p. 10-18.

Catalytic activity of a number of oxides and salts. Graphs, table. 32 ref.

9375* Thermodynamics of Oxide Phases of Intermediate Composition. I. Thermodynamics of Ferrous Oxide. (Russian.) S. M. Ariia, M. P. Morozova, and L. A. Schneider. *Zhurnal Obshchei Khimii*, v. 24, no. 1, Jan. 1954, p. 41-47.

Equilibrium of reduction process of ferrous oxide by mixtures of CO_2 and CO at temperatures of 1140 and 1182 K. Tables, graphs. 10 ref.

9376* Kinetics of the Process of Absorption of Hydrogen Sulfide by Ferric Hydroxide. (Russian.) M. D. Kuznetsov and A. E. Sagalovskii. *Zhurnal Prikladnoi Khimii*, v. 27, no. 1, Jan. 1954, p. 5-11.

Heterogeneous process consisting of kinetic and diffusion stages and proceeds with formation of worked out layer. Tables, graph, diagram.

See also:

9787 (vapor pressure determination with thermo couple psychrometer)

COATINGS

9377 Trends and Factors Affecting Fatty Acid Usage in Alkyd Resins. K. A. Earhart. *American Paint Journal*, v. 38, Mar. 22, 1954, p. 74 + 9 pages.

Developments in formulation and use of alkyds; economic factors and effect of other chemicals, especially polyhydric alcohols and acids on use of fatty acids; and trends in specifications. 4 ref.

9378 Glycerine Alkyds Tailored to Need. Charles R. Bragdon. *American Paint Journal*, v. 38, Mar. 29, 1954, p. 76 + 5 pages.

Aspects of commercial manufacture and various processing methods, cost considerations, methods of evaluation, and new trends in alkyd use and design. 5 ref.

9379 Fundamentals of Paint, Varnish and Lacquer Technology. Chapt. X. The Clear Oleoresinous Finish. I. Elias Singer. *American Paint Journal*, v. 38, Apr. 5, 1954, p. 70 + 9 pages.

Properties of varnishes vs. clear lacquers; varnish cooking; materials and techniques. (To be continued.)

9380 The Practical Application of Color Theory to Paint Manufacture. L. P. Hunter. *American Paint Journal*, v. 38, Apr. 12, 1954, p. 30 + 10 pages.

Includes graph.

9381 Development of a Hiding Power Test Method—Report of Progress. M. H. Switzer. *ASTM Bulletin*, 1954, no. 197, p. 60-65.

Analysis of results obtained in cooperative testing of proposed method for objective determination of hiding power of paints. Graphs. 10 ref.

9381a Ryan Develops Ceramic-Liner Techniques. *Aviation Week*, v. 60, Apr. 26, 1954, p. 38, 40, 42.

New ways to apply and work with coatings point to solution of some high-heat powerplant problems. Photographs.

9382 Impregnation of Steel With Titanium in a Mixture of Molten Sodium Carbonate and Titanium Dioxide. S. Kowal. *Henry Brutcher, Altadena, Calif., Translation no.* 3152, 12 p. (From *Prace Instytutow Mechaniki* (Warsaw), 1953, no. 6, p. 5-12.)

Experimental materials and procedure. Effect of treating time and temperature upon case thickness. Micrographs, graphs, tables. 11 ref.

9383 Why Go to Thick Protective Coatings? R. R. Pierce. *Chemical Engineering*, v. 61, Apr. 1954, p. 177-179, 181.

Experimental studies. Graphs. 3 ref.

9384 Epoxys for Cements & Coatings. Raymond B. Seymour and Robert H. Steiner. *Chemical Engineering*, v. 61, Apr. 1954, p. 244 + 4 pages.

Resistance to chemical corrosion and physical properties. Charts.

9385 Coating With Mastics. Raymond B. Seymour and Robert H. Steiner. *Chemical Engineering*, v. 61, May 1954, p. 232 + 5 pages.

Asphaltic mastics protect steel against splash and fumes of salts, alkalis, and non-oxidizing acids up to 150 F. Photographs, charts.

9386 Laboratory and Plant Evaluations of Liquid Neoprene Coatings. R. B. Seymour. *Corrosion*, v. 10, Apr. 1954, p. 116-121.

Characteristics of several compositions; application and curing techniques; resistance to certain chemicals; and conformity with military and industrial standards. Table. 6 ref.

9387* Cadmium for Plating Connectors. D. C. Hubbard, R. W. Kunkle, and A. B. Chance. *Electrical World*, v. 141, Mar. 29, 1954, p. 47-48, 50.

Fortified Cd and hot-flowed electro-tin plate are desirable materials for plating connectors used in Al to Cu connections. Micrographs, graphs, charts.

9388 Factors Affecting the Choice of Finish for Electrical Equipment. E. C. J. Marsh. *Electroplating and Metal Finishing*, v. 7, Mar. 1954, p. 88-91.

Choice influenced by function of finish; conditions under which it will be used; practicability of incorporating necessary finishing operations in total production sequence; and cost of finish selected. Tables, photographs. (To be continued.)

9389* Measurement and Prevention of Sedimentation. (German.) C. Boller. *Fette, Seifen, Anstrichmittel*, v. 56, no. 2, Feb. 1954, p. 81-84.

Instrument measures and registers formation of sediments in lacquers and oil-paints. A number of surface-active agents tested for suitability of preventing sedimentation of pigments. Diagram, photograph, graphs.

9390 Modified Proteins for Stabilizing Latex Paints. Kenneth S. Ronai and Samuel M. Weisberg. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 774-777.

Relation of protein stabilizers to viscosity and freeze-thaw stability. Tables. 7 ref.

9391* Metal Spraying for Corrosion Prevention. C. A. Robiette. *Industrial Finishing (London)*, v. 6, Mar. 1954, p. 564-570, 572-573.

Equipment, methods, and applications. Drawing, photograph. 4 ref.

9392 New Low-Cost Coating Gives Mild Steel Good Corrosion Resistance. G. J. Harvey. *Iron Age*, v. 173, Apr. 15, 1954, p. 125-127.

Fast, low-cost application of a Ni-P coating gives mild steel corrosion-resistant properties comparable to some stainless steels. Application by brushing, dipping, or spraying. An oxide of Ni is reduced on coated surface at a temperature much lower than that of either the base metal or Ni. Photographs, micrograph, graph.

9393 Apparent Density of Thin Evaporated Films. M. S. Blois, Jr. and L. M. Rieser, Jr. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 338-340.

Measurements of Cu and Ag films formed by evaporation. Manifestations of low apparent densities in physical experiments. Graphs, diagrams. 10 ref.

9394 Adsorption Studies on Metals. III. The Sorption of Water Vapor on Nickel, Steel and Molybdenum. A. C. Zettlemoyer and J. J. Chessick. *Journal of Physical Chemistry*, v. 58, Mar. 1954, p. 242-245.

Study of oxide films using both gas adsorption and calorimetric techniques. Graph, tables. 7 ref.

9394a Aluminum Hard Coating Methods Review. *Light Metal Age*, v. 12, Apr. 1954, p. 10-11, 24.

Materials, equipment, techniques, and applications. Photographs, tables.

9395 HAE Process. Harry Evangelides. *Light Metal Age*, v. 12, Apr. 1954, p. 12-13, 33-34.

Techniques and characteristics of Mg hard surfacing. Photographs, diagram.

9396 The New Look in Galvanized Steel. Ernest W. Horvick. *Materials & Methods*, v. 39, Mar. 1954, p. 107-109.

Highly corrosion resistant, attractive, and workable coating made possible by modern, controlled processing. Photographs.

9397 Finishing Supplement Sprayed Metallic Coatings. H. Reininger. *Metal Industry*, v. 84, Mar. 26, 1954, p. 251-253; Apr. 2, 1954, p. 265-266; Apr. 9, 1954, p. 291-293.

Dependence of adhesive strength of coatings on surface condition of the metal. Surface preparation and treatment after coating. 83 ref.

9398* Further Development of the Technique of Metal Spraying. Hans Reininger. *Metalloberfläche*, Ausgabe B, v. 6, no. 3, Mar. 1954, p. 39-42.

Advantages and disadvantages of different surfaces for better adherence. Structure and properties of layers as function of grain size and spraying conditions. Diagrams, table, micrographs, photographs. 17 ref.

9399* Struggle Against Corrosion of Iron. Protection by Painting. (French.) Albin Marty. *Métallurgie et la construction mécanique*, v. 86, no. 3, Mar. 1954, p. 235 + 6 pages.

Preparation of surfaces, types of paints, and application.

9400* Advantages Derived From Use of Aluminum in Galvanization. (French.) R. Souké. *Métaux, Corrosion-Industries*, v. 29, no. 342, Feb. 1954, p. 88-89.

Deoxidizing action, adherence properties, and effect on Zn-Fe alloy. Graphs.

9401 The Meaning and Assessment of Light Fastness in Relation to Pigments. F. M. Smith and D. M. Stead. *Oil & Colour Chemists' Association, Journal*, v. 37, Mar. 1954, p. 117-129; disc., p. 129-130.

Wide differences in light fastness shown by using a pigment at same concentration in different media. Tables, photograph. 11 ref.

9402 The Surface Area Measurement of Paint Pigments. P. C. Carman. *Oil & Colour Chemists' Association, Journal*, v. 37, Apr. 1954, p. 165-173.

Simple air permeability apparatus, importance of surface area. Diagram, graph. 16 ref.

9403 Polystyrene Latices in Emulsion Paint Formulation: Post-Plasticised Systems. H. Taylor. *Oil & Colour Chemists' Association, Journal*, v. 37, Apr. 1954, p. 174-193.

Film-forming polymers compared with non-film-forming "externally" plasticized polymers. Pre- and post-plasticization and other modifications. Tables, photograph, photomicrograph.

9404 Optical Properties of Silicon Monoxide in the Wavelength Region from 0.24 to 14.0 Microns. George Hass and Calvin D. Salzberg. *Optical Society of America, Journal*, v. 44, Mar. 1954, p. 181-187.

Using evaporation conditions adjusted for deposition of true SiO, a series of films ranging in thickness from 0.03 to 10 μ were prepared on fused quartz, glass, rock salt, and highly reflecting Al surfaces. Graphs. 6 ref.

9405 Appearance Measurements. I. Reflectance. II. Gloss. Edward S. Beck. *Organic Finishing*, v. 15, Mar. 1954, p. 9-14; Apr. 1954, p. 16-23.

Instruments can measure various aspects but the human eye is final arbiter. Photographs, graph, diagrams. 3 ref.

9406 These Remarkable Epoxys. Charles A. Cerami. *Organic Finishing*, v. 15, Mar. 1954, p. 15-18, 23.

Combining epoxy group of resin finishes with phenolic or urea resins or fatty acids results in materials of great versatility. Photographs.

9407 Polyamide Resin Coatings. D. E. Peerman, D. Glaser, and M. S. Herban. *Organic Finishing*, v. 15, Apr. 1954, p. 12, 14.

Used alone or with epoxy resins.

9408 The Navy's Search for Anti-Corrosive Coatings for Magnesium. George W. Grupp. *Organic Finishing*, v. 15, Apr. 1954, p. 15.

$MgCrO_4$ and MgF_2 plus $ZnCrO_4$ is an improvement. "Micalith-G" and $CaCrO_4$ are good.

9409* The Use of Safflower Oil in Paint Vehicles. Joseph W. Prane. *Paint Industry Magazine*, v. 69, Mar. 1954, p. 15-18.

Economical source of pure linoleic acid. Produced by standard vegetable oil extraction process without solvent segregation and crystallization techniques. Tables, graphs.

9410* Cohesive Properties of Baked, Pigmented Soybean Oil Films. L. L. Carrick and Ralph E. Trease. *Paint, Oil & Chemical Review*, v. 117, Apr. 22, 1954, p. 12 + 7 pages.

Effect of addition of pigments including precipitated $CaCO_3$, anatase TiO_2, and carbon black, with three particle size ranges for each. Graphs, table.

9411* Growth of Fungi on Paint Films. K. Meier and H. Schmidt. *Paint and Varnish Production*, v. 44, Mar. 1954, p. 20-24, 41. (Translated from *Deutsche Farben-Zeitschrift*, May 1952.)

Kinds of fungi, conditions of growth, behavior of vehicles, influence of pigments, properties of paint films attacked, and protection. Drawing, micrographs, tables, graphs. 7 ref.

Coatings

9412 Paint Specifications for Metal Products. Paul E. Marling. *Product Engineering*, v. 25, Mar. 1954, p. 173-181.
Recommends finish formulations and application procedures for eight major classes of industrial products. Specific information connecting properties and composition. Photographs, table. 9 ref.

9413* Spotlighting Finishing Progress. Seymour Senderoff. *Products Finishing*, v. 18, Mar. 1954, p. 52 + 13 pages.
Finishing of Al; finishing systems for Al die castings; and formation of immersion Zn coatings on Al. Photographs, tables, graphs, diagrams.

9414* Protection of Aluminum and Its Alloys With Paints. II. (French.) André Guilhaudis and Régine Bourbon. *Revue de l'Aluminium*, v. 31, no. 207, Feb. 1954, p. 47-51.
Efficiency of protection given by primary coatings and finishes. Graphs, micrographs, table. 4 ref.

9415* The Continuous Galvanizing of Steel Strip by Sendzimir Process. (French.) A. Ollivet. *Revue de métallurgie*, v. 51, no. 1, Jan. 1954, p. 17-24 + 1 plate; disc., p. 25-27.
Special heat-treatment in controlled atmosphere before galvanizing causes oxidizing and reducing reactions, changes in crystal structure, and increased temperature of strip insuring perfect adherence of coating. Photographs, diagrams.

9416* The Tube Galvanizing Shop of the Société Lorraine Escaut. (French.) J. Fleischmann. *Revue de métallurgie*, v. 51, no. 1, Jan. 1954, p. 28-34; disc., p. 34-35.
Successive operations; output, consumption of Zn and fuel, and by-products. Diagram, photographs, graphs.

9417* Effect of the Quality of Coating on Corrosion Resistance of Galvanized Steel Wires. (French.) Jean Hérenguel. *Revue de métallurgie*, v. 51, no. 1, Jan. 1954, p. 36-44; disc., p. 44.
Thickness, structure, brittleness, and accelerated corrosion tests. Tables, graphs, micrographs, diagram.

9418* Field of Force in the Grinding Slit of a Paint Rolling Mill. (German.) Charles Hummel. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 2, Feb. 1954, p. 49-51.
Hydrodynamic equations applied to paint as a viscous fluid when dispersed on a roller mill. Integration gives pressure generated at nib of rolls. Diagrams, graph.

9419* Research on Formation of Pores and Pin Points in Highly Acid-Resistant Enamelled Cast-Iron Apparatus. (German.) Jens Holm and Hildegard Schneider. *Silikat Technik*, v. 5, no. 1, Jan. 1954, p. 13-22.
Non-defective coatings produced on cast iron with high P and S content. Tables, graphs, micrographs, diagram.

9420* Selected Methods of Heating Zinc-Plating Tanks. (German.) Josef Kohlgrüber, Josef Leutbecher, and Theodor Türk. *Stahl und Eisen*, v. 74, no. 8, Apr. 8, 1954, p. 464-474.
Three new possibilities of heating galvanizing tanks; examples of application; relative thermal and economic efficiencies. Diagrams, graphs, photographs. 4 ref.

9421 Hot Dip Galvanizing. III. Materials and Methods. K. S. Frazier. *Steel*, v. 134, Mar. 1954, p. 138-139.
To protect advantages, all phases of base materials and preparatory processes must be thoroughly investigated. Micrographs, photographs, table.

9422* How About Fabricating Zinc Coated Steels? Lester F. Spencer. *Tooling and Production*, v. 19, Mar. 1954, p. 41 + 8 pages.
Use and advantages of Sendzimer process for surface protection. Table, photographs. 8 ref.

9423* Preparation, Properties and Optical Applications of Thin Films of Titanium Dioxide. Georg Hass. *Vacuum*, v. 2, Oct. 1952, p. 331-345.
Optical properties, structure, and oxidation of evaporated Ti films. Graphs, radiographs, tables, diagrams. 22 ref.

9424* The Distribution of Thin Films Condensed on Surfaces by the Vacuum Evaporation Method. L. Holland and W. Steckelmacher. *Vacuum*, v. 2, Oct. 1952, p. 346-364.
From various types of practical sources, idealized sources are evolved for which emission of vapor can be calculated. Diagrams, tables, graphs. 26 ref.

9425* Aluminum Reflecting Films Applied to Glass and Plastics by Thermal Evaporation. I. Aluminum Films on Glass With Particular Reference to Front Surface Mirrors. S. Bateson. *Vacuum*, v. 2, Oct. 1952, p. 365-376.
Fundamental principles governing deposition upon various materials. Tables, drawing, photograph, graphs. 10 ref. (To be continued.)

9426* Reactive Primers and Metal Painting. (German.) Benno Elfisch. *Werkstoffe und Korrosion*, v. 5, no. 2, Feb. 1954, p. 54-56.
Methods of manufacture. Composition depends on nature and properties of surface to be protected. 7 ref.

9427* Preparation and Passivation of Light Metals for Painting. (German.) Bernhard F. H. Scheifele. *Werkstoffe und Korrosion*, v. 5, no. 3, Mar. 1954, p. 94-98.
Method produces metal organic protective films by use of reactive primers. Films function as anti-corrosive coatings and adhesive substrates for paint and lacquer coatings. 12 ref.

9428* Controlling the Properties of Ground Enamel Coats for Steel. (Russian.) K. P. Azarov. *Zhurnal Prikladnoi Khimii*, v. 27, no. 1, Jan. 1954, p. 33-42.
Comparison of coatings with and without B. Additions of strong fluxes. Graphs, diagrams, tables. 10 ref.

Books and Miscellaneous Publications

9429 Symposium on Porcelain Enamels and Ceramic Coatings as Engineering Materials. 122 p. 1954. American Society for Testing Materials, Philadelphia. (TS700 Am35s)
Includes "Introduction", Dwight G. Bennett; "Some Examples of the Functional Use of Porcelain Enamel and Ceramic Coatings for Steel", G. H. Spencer-Strong; "Resistance of Porcelain Enamels to Weathering", Dwight G. Moore; "The Chemical Resistance of Glass Fused to Steel", E. A. Sanford and O. J. Britton; "Acid Resisting Properties of Porcelain Enamels", Harold C. Wilson; "Requirements for and Expected Benefits From the Application of Coatings to High-Temperature Components of a Jet Engine", A. C. Francisco and G. M. Ault; "High-Temperature Ceramic Coatings as Applied to Aircraft Power Plants", B. L. Paris; "The Industrial Processing of High-Temperature Ceramic Coatings", J. H. Terry; "The Abrasion Resistance of Various Types of Porcelain Enamel", Arthur V. Sharon; "The Resistance of Porcelain Enamels to Surface Abrasion as Determined by the PEI Test", John T. Roberts; "Torsion Testing as an Aid to the Porcelain Enamel Industry", E. L. Hoover; "The Strengthening Effect of Porcelain Enamel on Sheet Iron as Indicated by Bending Tests", E. E. Bryant; "Tension Tests of Porcelain Enameled Steel", W. A. Deringer; "Effect of Temperature on the Electrical Resistivity of Several Ceramic and Silicone-Type Coatings", Simon W. Strauss, Lloyd E. Richards, and Dwight G. Moore; "A Laboratory Evaluation of Ceramic Coatings for High Temperature Applications", Sara J. Ketcham; and "Guideposts in Selecting Porcelain Enamels and Ceramic Coatings. A Summary", W. N. Harrison.

9430 The Use of Ceramic Coatings in Gas Turbine Combustion Chambers. F. G. Code Holland. Paper from SELECTED GOVERNMENT RESEARCH REPORTS. v. X. CERAMICS AND GLASS. p. 1-7. 1952. Her Majesty's Stationery Office, London. (TP807 G79.7c)
Benefits resulting from application of ceramic coatings. Reduction in flame tube temperature calculated to be of the order of 80 C. Table. 3 ref.

9431 The Production and Uses of Tin Coatings. Frederick A. Lowenheim. Paper from SYMPOSIUM ON TIN. ASTM SPECIAL TECHNICAL PUBLICATIONS no. 141. p. 25-37; disc., p. 37-40. 1952. American Society for Testing Materials, Philadelphia. (TN793 Am35s)
Properties, methods of application, problems, and recent developments in Sn and Sn-alloy coatings. 32 ref.

9432 Trends in the Use of Tin in the Container Industry. R. R. Hartwell. Paper from SYMPOSIUM ON TIN. ASTM SPECIAL TECHNICAL PUBLICATION no. 141. p. 41-49; disc., p. 50-51. 1952. American Society for Testing Materials, Philadelphia. (TN793 Am35s)

Properties of tin plate; Sn consumption statistics; effect of new materials and coating methods on consumption. Graphs, tables. 7 ref.

See also:
9210 (ceramic coatings)
9274 (testing of oxide pigments)
9884 (tin coatings)
10048 (effect of oxide films on mechanical properties of Cd)
10418 (identification of natural resins)

CORROSION

9433* The Behavior of Titanium in Presence of a Gas at High Temperatures. (Italian.) P. Spinedi. *Alluminio*, v. 23, no. 1, Jan. 1954, p. 35-39.

Oxidation at increasing temperatures in O, CO_2, and N atmospheres. Graphs, tables. 11 ref.

9434* New Techniques and Current Problmes in Controlling Underground Corrosion. O. C. Mudd. *American Petroleum Institute, Proceedings*, sec. V. *Transportation*, v. 33, 1953, p. 35-45.

Includes adaptation of anodic metals for electrical-equipment groundings, isolation of reinforcing steel in concrete, and measures which prevent current flow to metal contacts supported by concrete. Diagrams, photographs, graphs, table.

9435 Resistance of Cast Fe-Ni-Cr Alloys to Corrosion in Molten Neutral Heat Treating Salts. J. H. Jackson and M. H. LaChance. *American Society for Metals, Transactions*, v. 46, 1954, p. 157-183.

Resistance of 65 alloys to corrosion in five commercial heat treating salt baths. Tables, graphs, diagram.

9436 Attack of Scaling-Resistant Materials by Vanadium Pentoxide and Effect of Various Alloying Elements Thereon. E. Fitzer and J. Schwab. *Henry Brutcher, Altadena, Calif., Translation no.* 3132, 15 p. (Slightly condensed from *Berg- und Hüttenmännische Monatshefte*, v. 98, no. 1, 1953, p. 1-7.)

Preliminary comparative scaling tests conducted on Cu, Ni, Fe, and Cr steels in pure O, V_2O_5-saturated O, and in O coupled with intermittent immersion into molten V_2O_5. Diagrams, graphs, tables, micrographs. 6 ref.

9437 Corrosion-Resistant Cemented Carbides. J. Hinnüber and O. Rüdiger. *Henry Brutcher, Altadena, Calif., Translation no.* 3135, 9 p. (Part I of "Cemented Carbides With High Resistance to Corrosion and Scaling" from *Archiv für das Eisenhüttenwesen*, v. 24, nos. 5-6, 1953, p. 267-269.)

Development work based on chromium carbides with Ni as a binder.

9438 Testing of Stainless Steels for Intergranular Corrosion. H. J. Rocha. *Henry Brutcher, Altadena, Calif., Translation no.* 3196, 10 p. (From *Stahl und Eisen*, v. 70, no. 14, 1950, p. 608-609.)

Requirements to be met by an ideal testing solution. Solutions other than $CuSo_4$-H_4SO_4 and their shortcomings. 12 ref.

9439 Process of Oxidation of Titanium Carbide-Cobalt Compositions. W. Kinna and O. Rüdiger. *Henry Brutcher, Altadena, Calif., Translation no.* 3223, 26 p. (From *Archiv für das Eisenhüttenwesen*, v. 24, nos. 11-12, 1953, p. 535-542.)

X-ray, electron-ray, metallographic, and ultramicroscopic investigations indicated parabolic law of oxidation in 600-1000 C range. Tables, graphs, micrographs.

9440* The Corrosion of Tin by Acetic Acid Dissolved in Organic Liquids. (French.) René Dubrisay and Francois Arlet. *Bulletin de la société chimique de France*, 1954, no. 3, Mar., p. 314-315.

Experimental results. Characteristics of products of corrosion which vary greatly with nature of the liquid solvent. Micrograph. 13 ref.

9441 Physical Chemistry of Metal Oxidation. Leo F. Epstein. *Ceramic Age*, v. 63, Apr. 1954, p. 37-40.

Thermodynamic and kinetic factors of importance in analyzing behavior of metal-ceramic seals, or more precisely metal-oxide combinations. Table. 19 ref.

9442 The Mechanism of Inhibition of the Corrosion of Iron by Sodium Hydroxide Solutin. II. J. E. O. Mayne and J. W. Menter. *Chemical Society, Journal*, 1954, Jan., p. 93-103.

Film formed on Fe by anodic discharge of hydroxyl ions is composed of material having cubic structure of either Fe_3O_4 or γ-F_2O_3. Consequently it is indistinguishable from air-formed film. Graph.

9443* Corrosion for Chemical Engineers. Corrosion and Design. I-II. L. L. Shreier. *Chemical & Process Engineering*, v. 35; *Corrosion Technology*, v. 1, Mar. 1954, p. 6-9; Apr. 1954, p. 39-42.

Applies theoretical principles of corrosion to practical problems. Effect of metal, method of construction, shape, velocity of liquid flow, and dissimilar metals in contact on the possibility of corrosion occurring. Graph, photographs, diagrams, tables. 44 ref.

9444* Corrosion Problems of Ammonium Sulphate Manufacture. A. W. Bamforth. *Chemical & Process Engineering*, v. 35; *Corrosion Technology*, v. 1, Apr. 1954, p. 31-35.

Materials of construction covered include stainless steels, Ni alloys, rubber-lined mild steel, Pb, Si irons, Al, and a number of plastics. Photographs, tables, diagrams. 50 ref.

9445 Rate of Oxidation of Three Nickel-Chromium Heater Alloys Between 500° and 900° C. Earl A. Gulbransen and Kenneth F. Andrew. *Electrochemical Society, Journal*, v. 101, Apr. 1954, p. 163-170.

Studies of oxidation rate of three alloys as function of time and temperature. Data is related to parabolic rate law and classical theory of diffusion. Tables, graphs. 20 ref.

9446 Surface Reaction Between Oxygen and Thorium. A. F. Gerds and M. W. Mallett. *Electrochemical Society, Journal*, v. 101, Apr. 1954, p. 171-174.

Rate of reaction of O with arc-melted and rolled iodide Th was found to obey parabolic rate law in temperature range of 850 to 1415 C at one atmosphere pressure. Diagram, graphs, table. 13 ref.

9447 Action of Polar Organic Inhibitors. Norman Hackerman and A. C. Makrides. *Industrial and Engineering Chemistry*, v. 46, Mar. 1954, p. 523-527.

Theories of cathodic inhibition of corrosion, adsorption of polar organic inhibitors, and applications of mechanism. 45 ref.

9448* The Resistance to Failure of Condenser and Heat Exchanger Tubes in Marine Service. P. T. Gilbert. *Institute of Marine Engineers, Transactions*, v. 66, Jan. 1954, p. 1-6; disc., p. 6-20.

Types of corrosion causing failures. Development of resistant alloys. Table, photographs, micrograph. 25 ref.

9449 Treatment of Water for the Iron and Steel Industry. A. J. Lamb and A. H. Waddington. *Iron and Steel Institute, Journal*, v. 176, Mar. 1954, p. 291-302.

Types of water usually available; treatment necessary to make them suitable for particular purposes; design of plant used to effect treatment; chemical reagents more commonly used; and plant control. Photographs, diagrams.

9450 The Corrosion of Machinery in H.M. Ships. L. Kenworthy. *Journal of Applied Chemistry*, v. 4, Mar. 1954, p. 97-106.

Examples of corrosion problems and remedial measures. Photographs, micrographs. 21 ref.

9451 The Corrosion-Metallurgical Aspects of Sucker Rods and Their Oil Well Service Performance. F. J. Radd and R. L. McGlasson. *Journal of Petroleum Technology*, v. 6; *American Instiute of Mining and Metallurgical Engineers, Transactions*, v. 199, Mar. 1954, p. 37-44.

Mechanisms of corrosion and corrosion fatigue damages examined from a fundamental electrochemical viewpoint. Relation-

Corrosion

ships of sucker rod microstructures to these damaging effects. Diagrams, photographs, micrographs. 15 ref.

9452 Minimizing Fretting Corrosion. E. M. Johnson. *Machine Design*, v. 26, Apr. 1954, p. 348, 350, 352, 354.

Effects of lubricants; hardness; material; and clearance of fits of moving parts as applied to ferrous metals.

9453* Intercrystalline Corrosion of Zinc-Aluminum-Copper Alloys. (German.) E. Pelzel. *Metall*, v. 8, nos. 5-6, Mar. 1954, p. 169-173.

Study to determine structural connections between high and low Al content and influence of Cu. Graphs, photographs, tables, diagram, micrographs. 6 ref.

9454* Corrosion by Benzine and Chlorinated Hydrocarbons. (German.) W. Katz and J. Sonntag. *Metall*, v. 8, nos. 5-6, Mar. 1954, p. 203-205.

Stability of pure Al, Al-Mg alloys, Duralumin, die-cast Al, Zn, Pb, and Cr-Ni steel. Tables, photographs, micrographs. 4 ref.

9455* Scaling of Metals by Sulfur and Sulfur-Containing Gases. (German.) O. Kubaschewski and O. von Goldbeck. *Metalloberfläche*, Ausgabe A, v. 8, no. 3, Mar. 1954, p. 33-36.

Influence of moisture and temperature varies with corroding compounds and with the metals. Tables. 40 ref.

9456* Cathodic Protection of the Interior of Cargo Compartments in Oil Tankers. John Lamb, E. V. Mathias, and W. Godfrey Waite. *North East Coast Institution of Engineers & Shipbuilders, Transactions*, v. 70, Mar.-Apr. 1954, p. 377-393.

Galvanic method using Mg-alloy anodes chosen as practicable. Results over 12 months period. Tables.

9457* Status of Digester Corrosion in the South. R. W. Mizell and C. W. Smith. *Paper Mill News*, v. 77, Apr. 24, 1954, p. 12-13, 16.

Review of literature. 12 ref.

9458* Investigation of Electrochemical Corrosion in Liquids of Low Dielectric Constants. (Polish.) St. Minc and L. Stolarczyk. *Przemysl Chemiczny*, v. 10(33), no. 2, Feb. 1954, p. 69-72.

Behavior of steel, Cu, brass, and Al in various solutions. Diagrams, graphs, micrographs. 6 ref.

9459* Corrosion Inhibitors of Steel in Sulfuric and Hydrochloric Acid. (Polish.) H. Jodko. *Przemysl Chemiczny*, v. 10 (33), no. 2, Feb. 1954, p. 75-80.

Investigates thiourea, dibenzene sulfoxide, Tardiol F, and urotropine. Tables. 2 ref.

9460* Corrosion of Steel Rods. (Norwegian.) Ivan Th. Rosenqvist. *Teknisk Ukeblad*, v. 101, no. 12, Mar. 25, 1954, p. 237-243.

Methods for protecting steel. Proposes protection of parts by cathodic means. Photographs, table. 6 ref.

9461 Effect of Low-Temperature Stress-Relieving on Stress-Corrosion Cracking. C. R. McKinsey. *Welding Journal*, v. 33, Apr. 1954, p. 161S-166S.

Controlled low-temperature stress-relieving effective in protecting welded plates from stress-corrosion cracking. Table, photographs, micrographs. 11 ref.

9462* Corrosion of Iron Resulting From Temperature Differences of Electrolytes. (German.) Walter Breckheimer and Jean D'Ans. *Werkstoffe und Korrosion*, v. 5, no. 2, Feb. 1954, p. 43-48.

Iron electrodes immersed in neutral KCl solution at varying temperatures will form a corrosion element. Diagrams, graphs.

9463* The Influence of Condition of the Surface of Iron Upon Rapidity of Corrosion When Buried in Soil. (German.) Tihomil Markovic. *Werkstoffe und Korrosion*, v. 5, no. 3, Mar. 1954, p. 81-83.

Current measurements with rough and smooth iron demonstrated that reversal of current direction, dependent on soil dampness, takes place between narrow limits. Graphs. 6 ref.

9464* Cathodic Corrosion Prevention. (German.) Wolfgang Thury. *Werkstoffe und Korrosion*, v. 5, no. 3, Mar. 1954, p. 84-87.

Possibilities and limits of application by use of external current supplies in connection with an auxiliary insoluble anode. Fe and Al were subjected to various forms of corrosion. Tables. 16 ref.

See also:
9501 (electrochemical dissolution of metal)
9747 (corrosion of turbine blades)
10152 (corrosion resistance of Al-Fe alloys)

ELECTRICAL ENGINEERING

9465 The Magnetic Circuit of Telephone Relays. I. A Study of Telephone Relays. (English.) Stig Ekelöf. *Acta Polytechnica (Electrical Engineering Series)*, v. 5, no. 4, 1953, 32 p. (T1 Ac81)

Distribution of magnetic flux in electromagnetic telephone relays. Graphs, tables, photographs, diagrams. 4 ref.

9466* Aluminum in High Frequency Equipment. (German.) F. Martin. *Aluminium*, v. 30, no. 3, Mar. 1954, p. 101-106.

Physical properties and application in transmitting and receiving equipment. Photographs, tables, graphs. 9 ref.

9467* Recent Progress in Industrial Application of Electrostatic Generators. (French.) Noël J. Félici. *Annales des Télécommunications*, v. 9, no. 2, Feb. 1954, p. 44-45.

Basic principles of electrostatic machines and development since 1942. Photographs, diagrams. 16 ref.

9468* A New High-Current Switch for Electrolytic and Electrothermal Applications. H. W. Graybill. *Applications and Industry*, 1954, no. 11, p. 1-6.

Traces development and application of a new type switch to a.c. and d.c. low-voltage circuits. Diagrams, drawings, photographs.

9469* Continuous Incremental Thickness Measurements of Non-Conductive Cable Sheath. B. M. Wojciechowski. *Bell System Technical Journal*, v. 33, Mar. 1954, p. 353-368.

Translates direct capacitance increments sensed by probes sliding on the surface of the sheath into thickness increments. Photographs, diagrams, graphs. 10 ref.

9470* The Theory of the Ideal Repulsion Motor. David Morris. *Bulletin of Electrical Engineering Education*, 1953, no. 11, p. 39-44.

Behaviour of repulsion motor in terms of vector loci. Diagrams.

9471* Electrical Properties of Microcrystalline Selenium. Gilbert Halverson. *Communication and Electronics*, 1954, Mar., p. 38-45.

Resistivity and temperature variation of resistivity for temperature range 25 to 150 C on Se samples containing I. Table, graphs, micrographs. 7 ref.

9472* A Simple Method of Measuring the Distribution of Electromagnetic Fields in a Resonant Cavity. (French.) Albert Septier. *Comptes rendus*, v. 238, no. 6, Feb. 8, 1954, p. 658-660.

Resonance frequency, varied by small deformations in the cavity wall, is changed by inserting a small metallic object to reveal distribution of fields at its locus. Graphs. 3 ref.

9473* Type-7 Crossbar Selector. R. W. Hutton. *Electrical Communication*, v. 31, Mar. 1954, p. 32-37.

Mechanism for selecting one of several trunk groups in a dial telephone switching system. Diagrams, photographs.

9474* Design Requirements of Relay Core Materials. J. P. Martin. *Electrical Manufacturing*, v. 53, Apr. 1954, p. 138-141.

Crux of relationship of desired magnetic characteristics of materials to design factors lies in air-gap ratio. Photographs, graphs, table.

9475* Japanese Load Growth Compels Grounding of Underground Cable System. Setsuo Fukuda. *Electric Light and Power*, v. 32, Mar. 25, 1954, p. 80-84.

Resistance grounding of underground cables reduces phase-to-neutral faults. Non-destructive insulation tests, including a new d.c. component measurement, help to maintain old cables. Diagrams, tables, graphs, photograph.

9476* Air-Blast Breakers. A Symposium of European Designs and Practices. R. Willheim. *Electric Light and Power*, v. 32, Mar. 25, 1954, p. 142-150.

Requirements, performance, design, and comparison of results for voltages above 110 kv. Diagrams, graphs, tables, photographs. 16 ref.

9477* Germany Chooses Aluminum for Overhead Lines. Th. Volgelsang. *Electric Light and Power*, v. 32, Mar. 25, 1954, p. 192-198.

Economic relationship between various metals for low, medium, and high voltage lines. Tables, graphs, diagrams, photographs. 2 ref.

9478* Norwegian Research Provides Data for Grounding in Difficult Terrain. II. Actual Grounding Methods. Th. Bednar. *Electric Light and Power*, v. 32, Apr. 1954, p. 108-113.

Difficult grounding conditions along 220-kv. transmission rights-of-way made necessary extensive theoretical investigations and experimental tests in a variety of soils and with all types of electrodes. Methods adopted are proving effective. Graphs, tables. (To be continued.)

9479 Stability of 2, 6-Di-Tertiary-Butyl-Para-Cresol Inhibited Transformer Oil in an Arc. R. Nichols Hazelwood, Kazumi Oura, and Raymond M. Frey. *Electrochemical Society, Journal*, v. 101, Apr. 1954, p. 185-188.

Includes graphs, tables. 15 ref.

9480* Differential Protection of Saturable Transformers by Additional Magnetization. (Russian.) A. D. Drozdov and V. V. Mikhailov. *Elektrichestvo*, 1953, no. 11, Nov., p. 40-44.

Necessary characteristics obtained with certain parameters and circuits. Trnasformer protection through increased sensitivity. Diagrams, graphs.

9481* Calculation of Total Electrical Resistance of Multi-Wire Steel Conductors. (Russian.) A. M. Ganelin. *Elektrichestvo*, 1953, no. 11, Nov., p. 59-60.

Shows necessity of introducing correction coefficients. Graph.

9482* Conclusions From Experience in Operating a Low-Voltage System. (Russian.) S. I. Ogorodnov. *Elektrichestvo*, 1953, no. 11, Nov., p. 67-69.

Recommendations for design and construction of systems for industrial enterprises. Diagrams.

9483* Laminated Split Ring Cores as a New Form of Soft Magnetic Materials. (German.) F. Assmus and R. Boll. *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 6, Mar. 11, 1954, p. 221-225.

Production, properties, design, uses, and advantages over other cores. Graphs, table, photograph. 8 ref.

9484* Accuracy of Response of Bimetal Releases for Motor-Protection Switches. (German.) W. Laig-Hörstebrock. *Electrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 7, Apr. 1, 1954, p. 245-248.

Mathematical treatment of thermal conductivity, radiation, and mechanical friction effecting response of switches. Diagram, graph. 3 ref.

9485 Effects of Electric Current Passing Through Rolling Bearings. O. Schenk. *Engineers' Digest*, v. 15, Mar. 1954, p. 108-110. (From *Der Maschinenschaden*, v. 26, nos. 11-12, Dec. 1953, p. 131-135.)

Permissible limits for inclusion of safeguards in design. Photographs. table, micrograph, diagram.

9486* A New Power Relay. H. Bayard. *Ericsson Review*, 1953, no. 4, p. 128-132.

Design and operation of device to control power load. Photographs, diagrams, table, graph.

9487 Electromagnetic Model-Power Transformer Unveiled. P. A. Abetti. *General Electric Review*, v. 57, Mar. 1954, p. 23-26.

Possible applications of a convenient-size scale model include detection of failures and their location within a transformer. Table, graph, photographs, diagrams.

9488 Motors for Refrigerating Plants. D. H. Ruark. *Heating and Ventilating*, v. 51, Apr. 1954, p. 83-88.

Types and data for proper motor selection. Photographs, drawings.

9489 The Co-Ordination of Insulation of High-Voltage Electrical Installations. J. S. Cliff. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 1, no. 128, Mar. 1954, p. 39-49; disc., p. 49-56.

Characteristics which affect choice of insulation; assessment of possible over-voltages; and selection of insulation for usual applications. Tables, graph. 25 ref.

9490 Electromagnetic Shielding With Transparent Coated Glass. Edward I. Hawthorne. *I.R.E., Proceedings*, v. 42, Mar. 1954, p. 548-553.

Transmission of uniform plane waves at normal incidence through a multilayer transparent coated glass structure, with thin conductive layers. Table, graphs, diagrams. 8 ref.

9491 Control of Eelectric Power Systems in Steel Plants. K. S. Kuka. *Iron and Steel Engineer*, v. 31, Mar. 1954, p. 105-112.

Flexible and stable distribution system is nerve center of a modern steel plant. Graph, tables, diagrams.

9492* Choosing Electric Cables. C. C. Barnes. *Mechanical World and Engineering Record*, v. 134, Mar. 1954, p. 129-133.

Cable structure as related to installation conditions. Graphs, tables, photographs. (To be concluded.)

9493* A Plan of Electric Power Generation for the Future Expansion of Japanese Power Industry. Taturo Okubo. *Memoirs of the Faculty of Engineering, Kyoto University*, v. 15, no. 4, Oct. 1953, p. 213-241.

Power plant characteristics to be considered in planning electric power generation for present and future. Graphs.

9493a* Special Pressurised Electrical Control System for Inflammable Atmospheres. *Petroleum*, v. 17, Mar. 1954, p. 84-87.

Pressurized system, originally designed to control electrical apparatus in situation where hydrogen and some excluded gases are present, it can also be used with advantage where other inflammable gases are concerned. Diagrams, photographs.

9494* Operation of 3-Phase Induction Motors on Unbalanced Voltages. J. E. Williams. *Power Apparatus and Systems* 1954, no. 11, Apr., p. 125-132; disc., p. 132-133.

Quantitative evaluation of motor losses and line currents with various patterns and magnitudes of voltage unbalance. Oscillograms, graphs, diagrams, table. 3 ref.

9495 How to Use Thermistors. Frank K. Bennett. *Product Engineering*, v. 25, Apr. 1954, p. 200-204.

Application circuits based on temperature-sensitive characteristics of thermistors. Data on uses other than temperature measurement or control. Diagrams, photographs, graphs.

9496 The Distribution of Temperature Along a Thin Rod Electrically Heated *in Vacuo*. I. Theoretical. S. C. Jain and K. S. Krishnan. *Royal Society, Proceedings*, v. 222, ser. A, Mar. 9, 1954, p. 167-180.

Determined uniquely by three parameters. Criterion for validity of well-known logarithmic formula for temperature distribution is shown. Graph. 10 ref.

9497 Capacity Commutator Eliminates Frictional Contacts. Angelo Montani. *Tele-Tech*, v. 13, Mar. 1954, p. 76-77, 181-187.

Elimination of destructive frictional effect bteween sliding contacts by variable-capacity type of sequential coupling. Graphs, diagrams.

Electrical Engineering

9498* Heating Elements. (Dutch.) J. A. A. Ketelaar and G. Broers. *T.N.O.-Nieuws*, v. 9, no. 95, Feb. 1954, p. 39-41.

Dutch studies on equipment to produce electricity directly from coal. Diagrams, table, photograph. 4 ref.

9499 Fundamentals of Electrical Insulation. I. Chemistry of Insulation. Jack Swiss. **II. Physics of Insulation.** T. W. Dakin. *Westinghouse Engineer*, v. 14, May 1954, p. 114-124.

Phenomena of insulation mechanism from both viewpoints. Tables, diagrams, graph.

See also:

9177 (electrical resistance of MgO)
9195 (glow-bar heating elements)
9352 (dielectric breakdown of liquids)
9387 (plating on electrical connectors)
9766 (measurement of very small electric currents)
9815 (greases for electric motors)
9824 (analogous systems)
9873 (Te-Pb alloy sheath for power cable)
9967 (induction melting furnaces)
10094 (mechanical properties of Al electrical bus)
10516 (rectifiers vs. motor generators)

ELECTROCHEMISTRY AND ELECTROPROCESSES

9500 Study of Antifriction Properties of Chromium Deposits Made Porous by Mechanical Means. D. N. Garkunov and A. A. Polyakov. *Henry Brutcher, Altadena, Calif., Translation no.* 3134, 4 p. (From *Vestnik Mashinostroeniya*, v. 33, no. 6, 1953, p. 65-67.)

Previously abstracted from original. See item 1027, v. 3, Jan. 1954.

9501* Electrochemical Dissolution of a Metal in Presence of an Anion That Precipitates the Metallic Cation Formed. Equation of Polarization Curve. (French.) J. Badoz-Lambling. *Bulletin de la société chimique de France*, 1954, no. 3, Mar., p. 370-375.

Studies of Ag halogenides were in qualitative agreement with established equations. Tables, graphs. 21 ref.

9502* The Overvoltage of Copper in a Solution of Copper Acetate. (French.) Minko Balkanski. *Comptes rendus*, v. 238, no. 11, Mar. 15, 1954, p. 1221-1223.

Studies made on ordinary out-of-phase apparatus by measuring potential of a Cu electrode on electrolytically polished Cu plate dipped in a 10-molar solution of Cu. Graphs. 1 ref.

9503* Nickel-Cadmium Batteries in the Spotlight. *Diesel Power*, v. 32, Mar. 1954, p. 40-43.

Recent developments markedly improve physical and functional characteristics. Photographs, graphs.

9504 Semiconductors as Solid Electrolytes in Electrochemical Systems. Kurt Lehovec and Jacob Broder. *Electrochemical Society, Journal*, v. 101, Apr. 1954, p. 208-209.

Development of solid state batteries. 13 ref.

9505* Electrolytic Conductivity. H. Wilson. *Instrument Engineer*, v. 1, Apr. 1954, p. 87-94.

Relevant theory and possible limitations of conductivity measurement. Diagrams, table, graphs, photographs, drawings.

9506 New Methods for Finishing Powder Metal Parts. Charles C. Cohn. *Iron Age*, v. 173, Apr. 1, 1954, p. 125-128.

Field-tested finishing techniques show that plated powder metal parts are far superior to conventionally plated metal parts in corrosion resistance. Table, photograph.

9507 Industrial Hard-Chromium Plating. Warren Schmidt and William E. Hogan. *Mechanical Engineering*, v. 76, Mar. 1954, p. 248-254.

Facts mechanical engineers should know about modern plating techniques. Photographs, tables, graph.

9508* Plating on Lead Alloys, Pewter and Britannia. Joseph Haas. *Metal Finishing*, v. 52, Apr. 1954, p. 56-61.

Practical, simple, and accurate method of plating any metal on Pb and Sn alloys.

9509* Bronze and Speculum Plates Provide Good Protection for Steel. W. H. Safranek, W. G. Hespenheide, and C. L. Faust. *Metal Finishing*, v. 52, Apr. 1954, p. 70-73, 78.

Salt-spray and outdoor-exposure tests demonstrate bronze alloy plate protects steel better than Cu- and/or Ni-plates. Tables, photographs, micrograph. 16 ref.

9510 A Porosity Test for Electrodeposits on Zinc-Base Die-Castings. H. K. Lutwak. *Metal Finishing*, v. 52, Apr. 1954, p. 76-78.

Materials, apparatus, and techniques. 8 ref.

9511* Tin-Zinc Alloy Deposits. (German.) Hermann Heinemann. *Metalloberfläche*, Ausgabe B, v. 6, no. 3, Mar. 1954, p. 33-35.

Working specifications for electroplating metals with Sn-Zn alloy claimed to be superior to Sn-plating in hardness, wear-resistance, and rust protection.

9512* The Solution of Metal Monocrystals in Acids. Determinations on Aluminum, Lead, and Zinc. (Italian.) Giampaolo Bolognesi. *Metallurgia italiana*, v. 46, no. 1, Jan. 1954, p. 9-12.

Important where surface reactivity is essential. Use in electrochemical surface reproduction. Photographs, graph. 8 ref.

9513 Analysis of the Formation Current in Electrolytic Oxidation of Zirconium. J. J. Polling and A. Charlesby. *Physical Society, Proceedings*, v. 67, no. 411B, Mar. 1, 1954, p. 201-210.

Formation current consists of both ionic and electronic components. Former produces film growth; latter liberates O. Components are measured separately. Diagram, tables. 6 ref.

9514* Production Barrel Plating to Specifications. Ezra A. Blount. *Products Finishing*, v. 18, Apr. 1954, p. 24-32, 34, 36.

Equipment, plant layout, and operating procedures. Photographs, diagram.

9515* The Finishing of Aluminum. Structural Features of Oxide Coatings on Aluminum. Seymour Senderoff. *Products Finishing*, v. 18, Apr. 1954, p. 78 + 4 pages.

Decorative and protective oxide coatings formed in electrolytes containing sulfuric or chromic acids. Diagram, table, micrographs.

9516 Further Studies of the Mechanism by Which Hydrogen Enters Metals During Chemical and Electrochemical Processing. L. D. McGraw, W. E. Ditmars, C. A. Snavely, and C. L. Faust. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3164, Mar. 1954, 37 p. (TL570 Un3t)

Current work shows that H enters metals when hydrogen-metal alloy formation is simultaneous with discharge of H atoms. Graphs, diagrams, tables. 17 ref.

9517* The Anodic Behavior of Aluminum and Al-Mg Alloys in Sulfuric Acid and Sodium Sulfate Solutions. (German.) Willi Machu and M. Kamal Hussein. *Werkstoffe und Korrosion*, v. 5, no. 2, Feb. 1954, p. 49-54.

Only one cathodic polarization effects loosening of oxide film, always followed by rapid passivation. Graphs. 8 ref.

9518* Contribution to the Theory of Chemical Polarization During Solution, Separation, and Overvoltage of Metals. (German.) Willi Machu. *Werkstoffe und Korrosion*, v. 5, no. 3, Mar. 1954, p. 87-92.

Surface layers restraining adjustment of association equilibrium. Formation continues at high rate; indicates behavior of metal in solution after preliminary treatment. Tables, graphs. 13 ref.

9519* Alternating-Current Measuring Methods in Electrochemistry. (German.) Heinz Gerischer. *Zeitschrift für Elektrochemie*, v. 58, no. 1, 1954, p. 9-24.

Includes diagrams. 203 ref.

9520* Cathodic Deposition of Nickel from Molten Chloride Baths. (Russian.) S. F. Pal'guev and M. V. Smirnov. *Zhurnal Prikladnoi Khimii*, v. 26, no. 11, Nov. 1953, p. 1166-1175.

Quality of cathodic deposits depends on current flow. Diagram, tables, micrographs. 4 ref.

9521* Electrochemical Deposition of Very Hard Gold Coats. (Russian.) N. P. Fedot'ev, N. M. Ostroumova, and P. M. Viacheslavov. *Zhurnal Prikladnoi Khimii*, v. 27, no. 1, Jan. 1954, p. 43-50.

Optimum conditions of deposition in Au-Ni baths. Precipitates tested for microhardness and wear resistance. Tables, graphs. 7 ref.

9522* Removing the Coat of Lead-Tin Alloy From Lead-Treated Iron. (Russian.) V. P. Kochergin. *Zhurnal Prikladnoi Khimii*, v. 27, no. 1, Jan. 1954, p. 51-54.

Increased temperatures and concentration of KOH or addition of *m*-nitrobenzoic acid accelerate removal of Zn and Sn. Table. graphs. 6 ref.

9523* Influence of Thiocarbamide on Electrocrystallization of Copper. (Russian.) L. I. Antropov and S. Ia. Popov. *Zhurnal Prikladnoi Khimii*, v. 27, no. 1, Jan. 1954, p. 55-63.

Cathodic and anodic polarizaiton in acid Cu baths. Graphs, micrographs. 33 ref.

9524* Structure of Copper-Nickel Anodes and Process of Sediment Formation. (Russian.) A. A. Bulakh and O. A. Khan. *Zhurnal Prikladnoi Khimii*, v. 27, no. 1, Jan. 1954, p. 111-112.

Amount of sedimentation on cast alloy anodes shown to be higher than on annealed alloy anodes. Table. 7 ref.

9525* Reactivation of Electrolyte for Polishing Steel. (Russian.) N. P. Fedot'ev. E. G. Kruglova, and S. Ia. Grilikhes. *Zhurnal Prikladnoi Khimii*, v. 27, no. 2, Feb. 1954, p. 157-165.

Reasons for cessation of electrolytic activity. Method of regeneration. Tables, graphs. 4 ref.

9526* Potentials of Copper and Nickel Sulfides. (Russian.) A. A. Bulakh and O. A. Khan. *Zhurnal Prikladnoi Khimii*, v. 27, no. 2, Feb. 1954, p. 166-170.

Composition of electrolyte and electrode used. Tables, graphs, diagram. 5 ref.

9527* Influence of Thiocarbamide on Electrocrystallization of Nickel. (Russian.) L. I. Antropov and S. Ia. Popov. *Zhurnal Prikladnoi Khimii*, v. 27, no. 2, Feb. 1954, p. 206-209.

Possibility of producing lustrous Ni precipitates. Graphs, micrographs. 6 ref.

Books and Miscellaneous Publications

9528 Electrodeposition Research at Battelle Memorial Institute. Paper from ELECTRODEPOSITION RESEARCH. NATIONAL BUREAU OF STANDARDS CIRCULAR 529. p. 29-34; disc., p. 34-35. 1953. U.S. Dept. of Commerce, Washington. (TS670 Un3.5e)

Includes "Introduction", C. L. Faust; "An Investigation of Electrodeposited Alloys and Pure Metals as Substitutes for Zinc and Cadmium for Protective Finishes for Steel Parts of Aircraft", A. B. Trippler, Jr.; "The Mechanism of Hydrogen Entry Into Metals", L. D. McGraw; and "Electroforming Aluminum", W. H. Safranek.

See also:
9282 (control of plating solutions)
9396 (electrolytic galvanizing)
9458 (electrochemical corrosion)
9758 (thickness measurement of anodic coatings)
9884 (electroplated tin)
9944 (effect of casting method on surface of anodized Al)
9954 (cleaning of metals for electroplating)

ELECTRONICS

9529 Effect of Dislocations on Minority Carrier Lifetime in Germanium. (English.) S. S. Kulin and A. D. Kurtz. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 354-356.

Densities measured by X-ray and metallographic methods. Results correlated with measurements of lifetime of minority carriers. Diagram, graph. 4 ref.

9530 On the Excitation of Different Space Charge Wave Modes in Travelling Wave Tubes. (English.) O. E. H. Rydbeck. *Acta Polytechnica (Electrical Engineering Series)*, v. 5, no. 2, 1954, 15 p. (T1 Ac81)

Study, limited to beams of moderate current density, shows that tube root equation consists of two coupled equations, one for free electron beam and one for free helix. Graph. 2 ref.

9531 A Wideband Searching Automatic Frequency Control Circuit of New Type. (English.) Henry Wallman. *Acta Polytechnica (Electrical Engineering Series)*, v. 5, no. 3, 21 p. (T1 Ac81)

New AFC method replaces discriminator by a resonant circuit combined with continuously sweeping oscillator and time-differentiator which actuates a frequency-reversing circuit. Diagrams, graphs, photographs.

9532 Oscilloscope Pictures of Intermodulation Distortion. Richard C. Hitchcock. *American Journal of Physics*, v. 22, Apr. 1954, p. 187-190.

One low- and one high-frequency sinusoidal signal are simultaneously applied to input of an audio-amplifier. Oscillograms measure distortion. Graph, diagram, oscillograms. 5 ref.

9533* Effect of Oxygen on Conductivity of CdS Crystals. (German.) W. Muscheid. *Annalen der Physik*, v. 13, nos. 6-8, Dec. 15, 1953, p. 305-321.

Disorder model explains dark and photo-conduction in temperature range 300 to 700 K. Diagrams, graphs, table. 38 ref.

9534* The Proof of Traps in CdS Monocrystals. (German.) W. Muscheid. *Annalen der Physik*, v. 13, nos. 6-8, Dec. 15, 1953, p. 322-326.

Dark conduction of crystals often pass through maxima at 100 C and occurs only when crystals are illuminated before heating. Graphs. 8 ref.

9535* The Theory on Conductivity of Semiconductors. (German.) Wolfgang-Hermann Isay. *Annalen der Physik*, v. 13, nos. 6-8, Dec. 15, 1953, p. 327-348.

Approximation method of solution. Diagrams, graphs. 7 ref.

9536* Hall-Effect Measurements on CdS Crystals. (German.) H. Diedrich. *Annalen der Physik*, v. 13, nos. 6-8, Dec. 15, 1953, p. 349-352.

Experiments under different light intensities. Mobility of excess electrons. Graphs. 9 ref.

9537* Damped Oscillations of a Quartz Crystal in Liquids at Different Temperatures. (English.) S. Parthasarathy, Harkrishan Singh, and M. Pancholy. *Annalen der Physik*, v. 13, nos. 6-8, Dec. 15, 1953, p. 352-358.

Investigates improved accuracy of measurements by modifying apparatus and effect of temperature on measured values. Graphs, photographs, table, diagrams. 10 ref.

9538* Some Remarks on Gisolf's Theory of Phenomena of Electronic Fluctuations in Semiconductors. (German.) K. W. Böer. *Annalen der Physik*, v. 14, nos. 1-2, Jan. 1954, p. 87-96.

Computes square of current change from fluctuation in density of conduction electrons. At low frequencies this effect can exceed the noise according to Nyquist by factor of 10^4. Diagram, graphs. 11 ref.

9539* Reflection of Electromagnetic Waves on Metal-Plate Media. (German.) Gerhard Piefke. *Arkiv der elektrischen Übertragung*, v. 8, no. 3, Mar. 1954, p. 101-110.

Reflection and passage coefficients with perpendicular incidence of a plane wave on metal plates. Graphs, diagram. 4 ref.

9540* Disturbances in Frequency Modulation in Non-Idealized Receivers. (German.) Hans Marko. *Arkiv der elektrischen Übertragung*, v. 8, no. 3, Mar. 1954, p. 111-122.

Deficencies of amplitude limiter, discriminator network, and detector stage cause considerable increase in interference level. Tables, diagrams, graphs. 8 ref.

Electronics

9541* Transparent Semiconducting Oxide Films. R. E. Aitchison. *Australian Journal of Applied Science,* v. 5, Mar. 1954, p. 10-17.

Method of preparation and properties of transparent conducting layers prepared for use in investigations on electroluminescence. Graphs, diagram, table. 8 ref.

9542 Arinc Pinpoints Military Tube Failures. Philip Klass. *Aviation Week,* v. 60, Apr. 5, 1954, p. 52 + 5 pages.

Removals cut by better maintenance, careful handling, and use of fault-predicting devices. Diagram, graph, photographs.

9543* Amplifiers for the L3 Coaxial System. Owen L. Williams. *Bell Laboratories Record,* v. 32, Apr. 1954, p. 139-142.

Special design and close control in manufacture are necessary to make coaxial carrier system economical. Photographs, diagram, graphs.

9544* The Transistor as a Network Element. J. T. Bangert. *Bell System Technical Journal,* v. 33, Mar. 1954, p. 329-352.

Theoretical analysis, confirmed by experiment, of certain possible network applications of transistors. Table, digarams, graphs, photograph. 21 ref.

9545* Wave Propagation Along a Magnetically-Focused Cylindrical Electron Beam. W. W. Rigrod and J. A. Lewis. *Bell System Technical Journal,* v. 33, Mar. 1954, p. 399-416.

Extends traveling-wave tube theory to case of focused beams. Compares gain constants for two types of electron motion. Graphs. 11 ref.

9546* Some Effects of Slow Electron Bombardment in Thermionic Valves. D. A. Wright. *British Journal of Applied Physics,* v. 5, Mar. 1954, p. 108-111.

Interaction between slow electrons and solids upon which they impinge. Graphs, tables. 13 ref.

9547 New Advances in the Junction Transistor. E. W. Herold. *British Journal of Applied Physics,* v. 5, Apr. 1954, p. 115-126.

Alloy process and analyses show how current amplification factor varies with geometry, surface recombination, and emitter current injection. Graphs, photographs, diagrams. 17 ref.

9547a TV. Can It Tlep the Steel Industry? *British Steelmaker,* v. 20, Apr. 1954, p. 126-128.

How equipment work and costs of operation, along with actual installations now in service. Photographs.

9548* The Design, Use and Application of a.c. Impedance-Type Network Analysers. Colin Adamscn. *Bulletin of Electrical Engineering Education,* 1953, no. 11, p. 7-22.

Basis of design and field of application of network analyzers. Tables, diagrams. 11 ref.

9549* A Fully Automatic Teletypewriter Switching Center for Military Use. Leith Johnston and R. C. Stiles. *Communication and Electronics,* 1954, Mar., p. 27-37.

Transmits message from point of origin to one of several intermediate points where it is automatically switched to required circuits. Diagrams, photographs. 1 ref.

9550* Measuring Absolute Temperature of a Metallic Conductor From Electric Voltage Produced by Agitation of Electrons. (French.) Roger Aumont, Jacques Romand, and Boris Vodar. *Comptes rendus,* v. 238, no. 12, Mar. 22, 1954, p. 1293-1296.

Principle, apparatus, and results of measurements to 780 K. Graph.

9551* Electronics: Pace-Setter for Design, Production. Annesta R. Gardner. *Dun's Review and Modern Industry,* v. 63, Mar. 1954, p. 48-52.

Space and weight savings; automatic production of complex equipment twin goals of electronic industry. Photographs.

9552 A UHF Transmitter Employing Klystron Power Amplifiers. W. H. Sayer. *Electrical Engineering,* v. 73, Apr. 1954, p. 354-359.

Tube uses transit time to advantage. Withstood test of time in generating high power for all U.H.F. channels in the frequency spectrum of 470 to 890 mc. Graphs, diagrams, table, photographs. 2 ref.

9553 Transistor Application Fundamentals. R. F. Shea. *Electrical Engineering,* v. 73, Apr. 1954, p. 360-365.

Gives basic equations for two designs. Compares over-all characteristics. Tables, graphs, photographs, diagrams.

9554 Thyratron Filament Connections. Morris Brenner and H. G. Schmitt. *Electrical Manufacturing,* v. 53, Mar. 1954, p. 96-99.

Based in part on AIEE Technical Paper 53-357. Flexible leads with solderless terminals offer advantages over spring contact connections for heavy currents involved in filament circuit of gas-filled power tubes. Photographs. 10 ref.

9555 Voltage Stabilizers for Microwave Oscillators. F. A. Benson and G. V. G. Lusher. *Electronic Engineering.* v. 26, Mar. 1954, p. 106-110.

Mathematical analysis of effect of varying heater voltage on stability of tube stabilizers. Diagrams. 4 ref.

9556 Minimizing Contact Potential in Apparatus Design. E. C. J. Marsh. *Electronic Engineering,* v. 26, Apr. 1954, p. 148.

Electroplated, sprayed, or "hot-dipped" coatings assist in design problems. Photographs, tables.

9557 An Industrial Batching Counter. R. W. Brierley. *Electronic Engineering,* v. 26, Apr. 1954, p. 157-160.

Counting equipment controls batching of mass-produced articles into small pre-determined quantities. Based upon a cold-cathode trigger tube. Diagrams, photographs.

9558 Military Reliability of Electron Tubes. E. R. Jervis and J. Swauger. *Electronics,* v. 27, Apr. 1954, p. 130-133.

Types most likely to fail; common kinds of failure. How designers and manufacturers can increase electron-tube reliability. Tables, charts. 3 ref.

9559 Practical Two-Stage Transistor Amplifiers. Robert L. Riddle. *Electronics,* v. 27, Apr. 1954, p. 169-171.

Capabilities of various configurations in experimental circuits using commercially available junction transistors. Diagrams, table.

9560 Frequency-Code Telemetering System. H. B. Schultheis, Jr. *Electronics,* v. 27, Apr. 1954, p. 172-176.

Analog data is conveyed numerically by simultaneous transmission of audio tone pulses whose on and off states correspond to binary digits. Diagrams, photographs, table. 11 ref.

9561 Measuring Transistor Temperature Rise. J. Tellerman. *Electronics,* v. 27, Apr. 1954, p. 185-187.

Measures temperature rise with power dissipation indirectly by noting change in magnitude of reverse collector current with zero emitter current. Graphs, oscillograms, diagrams. 2 ref.

9562 Time-Shared Amplifier Stabilizes Computers. Dean W. Slaughter. *Electronics,* v. 27, Apr. 1954, p. 188-190.

Quick recovery d.c. amplifier furnishes zero-point stabilization to 30 operational amplifiers used in analog computer. Interaction between amplifiers held to less than two mv. by circuit and filter design techniques. Diagrams, photograph. 3 ref.

9563 Transistor Equations Using *h*-Parameters. C. C. Cheng. *Electronics,* v. 27, Apr. 1954, p. 191-192, 194.

Equations based on four *h*-parameters of base-input common-emitter circuit, permit rapid calculation of operating characteristics for other circuit configurations, using easily obtained measurements. Diagrams.

9564 Beam-Deflection Tube Simplifies Color Decoders. Robert Adler and Charles Heuer. *Electronics,* v. 27, May 1954, p. 148-151.

Sheet-beam synchronous detector eliminates color-difference

phase-splitting stages in color receivers. Low injection-power requirement permits both *I* and *Q* demodulators to be driven directly by sub-carrier reference oscillator. Drawing, oscillograms, diagrams, graphs. 2 ref.

9565 Ferroresonant Flip-Flop Design. Rudolph W. Rutishauser. *Electronics*, v. 27, May 1954, p. 152-153.

Application of ferroresonant switching units made to replace tubes in high-speed computer systems. Photograph, table, diagram. 8 ref.

9566 Transistors Convert Sine Waves to Pulses. R. E. McMahon, I. L. Lebow, and R. H. Baker. *Electronics*, v. 27, May 1954, p. 160-161.

Circuit uses eight point-contact transistors to amplify, square, and differentiate sine-wave input to give fast-rise positive and negative pulses. Photographs, diagrams, oscillograms. 2 ref.

9567* An Amplifier for Precision-Measurement of Power and Current. (German.) K. H. Werner. *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 6, Mar. 11, 1954, p. 205-209.

Inverse feedback, used in line repeaters of multi-channel-carrier-frequency systems, also stabilizes amplification constant. Table, graphs, diagrams, photograph. 3 ref.

9568* Ferrites With Rectangular Hysteresis Curve. (German.) O. Eckert. *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 7, Apr. 1, 1954, p. 253-256.

Factors affecting form of hysteresis curves of new types of ferrite. Conditions determining applicability as storage parts in magnetic "memories". Diagrams, tables, graphs.

9569 The Synthesis of Sequential Switching Circuits. D. A. Huffman. *Franklin Institute, Journal*, v. 257, Mar. 1954, p. 161-190.

Procedure by which requirements of sequential switching circuit can be reduced to requirements of several combinational switching circuits. Tables, diagrams. 4 ref. (To be continued.)

9570 Self-Heating Thermionic Tubes. E. G. Hopkins. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 3, no. 70, Mar. 1954, p. 77-83.

A.c. conducted by a self-heating tube in which conventional anode and cathode are replaced by two identical thermionic emitters, each acting alternately as anode and cathode. Graphs, diagrams.

9571 Behavior of Germanium-Junction Transistors at Elevated Temperatures and Power-Transistor Design. L. D. Armstrong and D. A. Jenny. *I.R.E., Proceedings*, v. 42, Mar. 1954, p. 527-530.

Limitations of transistors and cooling methods to permit operation at elevated temperatures. Table, graphs, drawings.

9572 The Tansistor as a Mixer. Jakob Zawels. *I.R.E., Proceedings*, v. 42, Mar. 1954, p. 542-548.

Analyses of point-contact and junction transistors as mixers; experimental results for signals up to 400 Mc. Graphs, tables, diagrams. 6 ref.

9573 Valve Noise Produced by Electrode Movement. Pamela A. Handley and Peter Welch. *I.R.E., Proceedings*, v. 42, Mar. 1954, p. 565-573.

Causes of tube noise analyzed; distinction between rattle noise and that produced by resonances. Oscillograms, graphs, tables.

9574 Ultra-Low-Frequency, Three-Phase Oscillator. Gilbert Smiley. *I.R.E., Proceedings*, v. 42, Apr. 1954, p. 677-680.

Design of oscillator, covering range from 0.01 to 1,000 cycles per sec., for servomechanisms. Diagrams. 4 ref.

9575 A Method of Solving Very Large Physical Systems in Easy Stages. Gabriel Kron. *I.R.E., Proceedings*, v. 42, Apr. 1954, p. 680-686.

Consists of dismantling original physical system into a number of component systems and solving each part independently. Diagrams. 9 ref.

9576 Radio Progress During 1953. *I.R.E., Proceedings*, v. 42, Apr. 1954, p. 705-759.

Developments in facsimile; wave propagation; industrial electronics; television broadcasting; piezoelectricity; electron tubes; semi-conductors; antennas and wave guides; sound recording and reproducing; information theory and moldulation systems; navigation aids; electro-acoustics; vehicular communications; radio transmitters; electronic computers; quality control; radio telemetering and remote control; magnetics; instrumentation and measurements; feed-back control systems; circuits; video techniques; audio techniques; and receivers. Photographs, map. 1085 ref.

9577 Electron Beam Reproducing Head for Magnetic Tape Recording. A. Melvin Skellett, Lawrence E. Loveridge, and J. Warren Gratian. *Institute of Radio Engineers, Transactions, Professional Group on Audio*, v. AU-2, no. 1, Jan.-Feb. 1954, p. 23-27. (TK1 In6.6t)

Magnetic flux in tape guided by magnetic structure into tiny cathode ray tube where it deflects electron beam in proportion to instantaneous magnitude of flux. Diagrams, graphs, photographs. 3 ref.

9578 A Method of Analysis and Synthesis of Closed Loop Servo Systems Containing Small Discontinuous Non-Linearities. D. T. McRuer and R. G. Halliday. *Institute of Radio Engineers, Transactions, Professional Group on Circuit Theory*, v. CT-1, Mar. 1954, p. 19-34. (TK1 In6.6t)

Method for molding non-linear elements of systems into equivalent linear elements so existing linear analysis and synthesis may be applied. Graphs. 2 ref.

9579 Breakdwn and Leakage Resistance Investigation of Metallized Paper Capacitors. John Burnham. *Institute of Radio Engineers, Transactions, Professional Group on Component Parts*, PGCP-1, Mar. 1954, p. 3-17. (TK1 In6.6t)

Clarifies self-heating property; presents experimental evidence on breakdown. Tables, graphs.

9580 A Comparison of 6AK5 and 5654 Tubes. Floyd A. Paul. *Institute of Radio Engineers, Transactions, Professional Group on Component Parts*, PGCP-1, Mar. 1954, p. 18-32. (TK1 In6.6t)

Vibration and shock as basis for test. Photographs, tables, diagram.

9581 System Organization of the DYSEAC. A. L. Leiner and S. N. Alexander. *Institute of Radio Engineers, Transactions, Professional Group on Electronic Computers*, v. EC-3, no. I, 1954, p. 1-10. (TK1 In6.6t)

General-purpose high-speed digital computer utilizing same basic electronic circuit elements as SEAC. Features impromptu interchange of information. 2 ref.

9582 Symposium on Statistical Methods in Communication Engineering. *Institute of Radio Engineers, Transactions, Professional Group on Information Theory*, PGIT-3, Mar. 1954, p. 1-159. (TK1 In6.6t)

Includes "Passage of Stationary Processes Through Linear and Non-Linear Devices", A. J. F. Siegert; "Statistical Theory of Signal Detection", David Middleton; "Detectability of Random Signals in the Presence of Noise", R. C. Davis; "The Response of Linear Systems to Non-Gaussian Noise", B. Gold and G. O. Young; "Estimation of Signal Parameters in the Presence of Noise", David Slepian; "The Use of the Method of Maximum Likelihood in Estimating Continuous-Modulated Intelligence Which Has Been Corrupted by Noise", Dante C. Youla; "Detection of Modulated Noise-Like Signals", Ralph Deutsch; "Statistically Almost Optimum Nonlinear Network Design (Abstract)", Otto J. M. Smith; "Simple Games of Strategy Occurring in Communication Through Natural Languages", Benoit Mandelbrot; "Application of Linear Graphs to Communication Problems (Abstract)", Arthur E. Laemmel; "Minimum-Cost Encoding of Information", Nelson M. Blachman; "Generalized Servomechanism Evaluation (Abstract)", William P. Caywood, Jr., Richard C. Lyman, and William M. Kaufman; and "Optimum Pulse-time Determination", A. J. Mallinckrodt and T. E. Sollenberger.

9583 Potential Distribution and Prevention of a Space-Charge-Induced Minimum Between a Plane Secondary Electron Emitter and Parallel Control Grid. George C.

Electronics

Sponsler. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 282-287.

Formulas define profile of electrostatic potential distribution in semi-infinite, space-charge-filled region. Diagrams, graphs. 3 ref.

9584 Methods of Processing Silver-Magnesium Secondary Emitters for Electron Tubes. Paul Rappaport. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 288-292.

Baking in presence of water vapor yields good secondary emitter. Graphs, photograph, micrographs, table. 6 ref.

9585 A Resonant Cavity Study of Semiconductors. Hsi-Teh Hsieh, James M. Goldey, and Sanborn C. Brown. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 302-307.

Maxwell's equations give dielectric coefficient and conductivity of center post in terms of natural frequency and Q of cavity. Graphs. 6 ref.

9586 Diode Theory in the Light of Hole Injection. John A. Swanson. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 314-323.

Theory of effect of ratio of hole current to total current on diode characteristic at higher forward voltages. Diagrams. 13 ref.

9587 Noise in Semiconductors: Spectrum of a Two-Parameter Random Signal. Stefan Machlup. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 341-343.

Spectrum is calculated for signal which may be in one of two states of different mean lives. 4 ref.

9588 Germanium Diodes From Spherical Pellets. W. C. Dunlap, Jr. *Journal of Applied Physics*, v. 25, Apr. 1954, p. 448-451.

Properties of Ge spheres prepared by ejection of molten droplets from a graphite crucible under gas pressure. Photographs, graph, diagrams.

9589 Magnetic Switching Circuits. Robert C. Minnick. *Journal of Applied Physics*, v. 25, Apr. 1954, p. 479-485.

Principles of static magnetic storage generalized for use of magnetic cores in switching. Oscillograms, photographs, table, diagrams. 6 ref.

9590 A Point Emitter-Junction Collector Transistor. Robert H. Kingston. *Journal of Applied Physics*, v. 25, Apr. 1954, p. 513-515.

Transistor structure utilizing a planar p-n junction as a collector and a point contact as an emitter. Diagrams, table, graph. 6 ref.

9591* Activation of Thermionic Thorium Oxide and Zirconium Oxide Cathodes. (French.) Guy Mesnard. *Journal de physique et le radium*, v. 15, no. 3, Mar. 1954, p. 151-155.

Thermionic activation of cathodes. Oxide deposits on various supports produce a reducing effect on the supports. Graphs. 6 ref.

9592 A Balanced Electrometer Amplifier. D. R. Hardy. *Journal of Scientific Instruments*, v. 31, Mar. 1954, p. 77-81.

Performance of amplifier measures unidirectional currents from 10^{-10} to 10^{-15} A, or potentials from 10^{-4} to 1 V. with a maximum input impedance of 10^{11} ohms. Diagrams, graphs, table. 11 ref.

9593 A Computer for Solving Some Problems in Connection With Traveling-Ware Particle Accelerators. M. C. Crowley-Milling. *Journal of Scientific Instruments*, v. 31, Mar. 1954, p. 100-104.

Construction and operation of analogue computer, designed to perform calculations of energy gain and to plot relative phase curves of particles in linear particle accelerators. Diagrams, graphs, photograph. 5 ref.

9594 Some Techniques for Making Stable Non-Rectifying Contacts to Germanium and Other Semi-Conductors. W. M. Mitchell. *Journal of Scientific Instruments*, v. 31, Apr. 1954, p. 147-148.

Employs condenser discharge and solder methods for Te and Ge. Diagrams.

9595 Manufacture and Testing of Germanium Triodes. *Machinery Lloyd (Overseas Ed.)*, v. 26, Mar. 13, 1954, p. 81, 83-87.

Characteristics, construction, and precautions. Photographs, diagrams.

9596* Semiconductor Resistors. (German.) Horst Grunewald and Matthias Falter. *Nachrichten Technik*, v. 4, no. 2, Feb. 1954, p. 89-91.

Uses and compositions. Graphs, photographs. 5 ref.

9597 Use of Mathieu Functions for Computing Field Distribution in an Antenna to Obtain a Given Directional Diagram. A. A. Pistolkors. *National Science Foundation Translation, no.* 113, Nov. 1953, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 89, 1953, p. 849-852.)

Precise reproduction of a given directional diagram is possible in two cases. Graphs. 2 ref.

9598 Determiation of Vapor Density Behind the Anode and Behind the Cathode of a Discharge Tube. A. M. Shukhtin. *National Science Foundation Translation no.* 193, Feb. 1954, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 92, 1953, p. 289-291.)

Effect of discharge current on vapor density. Diagrams, photographs. 2 ref.

9599 Reliable Scaling Circuits for Decade Tubes. J. C. Baker and G. G. Eichholz. *Nucleonics*, v. 12, Apr. 1954, p. 44-49.

Development of various self-contained decade counter tubes provides reliable and compact decade scaling circuits whenever long life, small bulk, and minimum maintenance are important. Diagrams, photographs, table. 21 ref.

9600* Study of RCA 5819 and EMI 6260 Photomultipliers as Individual Photon Counters. (English.) L. Colli, U. Facchini, and A. Rossi. *Nuovo cimento*, v. 11, ser. 9, no. 3, Mar. 1, 1954, p. 255-261.

Studies spectrum and intensity of background pulses at room and down to dry-ice temps. Diagrams, tables, graphs. 8 ref.

9601* A Simple Stigmator for Magnetic Electronlenses. (German.) S. Leisegang. *Optik*, v. 11, no. 2, 1954, p. 49-60.

Design and operation without electrical power. Permits reduction of axial astigmatism to less than 0.1μ and a resolving power of 1 $m\mu$. Table, graphs, diagram, photographs. 12 ref.

9602 The Focusing of Television Picture-Tubes With Ferroxdure Magnets. J. A. Verhoef. *Philips Technical Review*, v. 15, Jan. 1954, p. 214-220.

A new ceramic material for permanent magnets permits simplified lens for focusing in television tubes. Photographs, graphs, diagrams. 3 ref.

9603 Liberation of Electrons by Positive-Ion Impact on the Cathode of a Pulsed Townsend Discharge Tube. Robert N. Varney. *Physical Review*, v. 93, ser. 2, Mar. 15, 1954, p. 1156-1160.

Pulsed techniques with Townsend type of discharge conditions yields a highly sensitive measurement of the number of electrons escaping per ion impact. Oscillogram, graphs. 5 ref.

9604 Drift Mobiliites in Semiconductors. II. Silicon. M. B. Prince. *Physical Review*, v. 93, ser. 2, Mar. 15, 1954, p. 1204-1206.

Mobility of holes in n-type Si and electrons in p-type Si measured as functions of impurity concentration and temp. Graphs. 3 ref.

9605 Piezoresistance Effect in Germanium and Silicon. Charles S. Smith. *Physical Review*, v. 94, ser. 2, Apr. 1, 1954, p. 42-49.

Uniaxial tension causes a change of resistivity in Si and Ge of both n and p types. Complete tensor piezo-resistance determined experimentally and expressed in terms of pressure co-

efficient of resistivity and two simple shear coefficients. Diagrams, tables. 18 ref.

9606 The Electrical Conductance of Pressed Powders, in Particular of Zinc Oxide. J. C. M. Brentano and Colman Goldberg. *Physical Review*, v. 94, ser. 2, Apr. 1, 1954, p. 56-60.

Electrical conductance of a semiconducting material, pressed between parallel plates in an evacuated chamber, is determined for different pressures and temperatures. Graphs, diagram. 17 ref.

9607* All-Electronic 1-Cycle Carrier-Relaying Equipment. Relay Operating Principles. M. E. Hodges and R. H. MacPherson. *Power Apparatus and Systems*, 1954, no. 11, Apr., p. 174-186.

Description of relays and features that obtain 1-cycle operation and guarantee co-ordination between terminals. Diagrams, graph. 3 ref.

9608* Telephotography. (Russian.) V. Kovalenkov and A. Tarantsov. *Radio*, 1953, no. 11, Nov., p. 17-21.

Soviet telephotographic transmission apparatus. Means of recording and synchronizing. Frequency band. Diagrams, photograph.

9609* Methods of Modulation in Radio Relay Lines. (Russian.) L. Fink. *Radio*, 1954, no. 2, Feb., p. 32-36.

Simultaneous transmission of many conversations along one line by various methods of modulation. Graphs, diagrams.

9610* Beam-Tetrode Tube 6P6S. (Russian.) A. Azat'ian. *Radio*, 1954, no. 2, Feb., p. 42-46.

Amplifies power of electric oscillations of low voltage to several watts almost without distortion. Diagrams, graphs, tables.

9611* A Symmetrical-Transistor Phase Detector for Horizontal Synchronization. Bernard Harris and Albert Macovski. *RCA Review*, v. 15, Mar. 1954, p. 18-26.

Obtains good balance and uniformity of performance under unfavorable conditions of transistor symmetry and temp. Diagrams, table, graphs.

9612* High-Frequency Operation of P-Type Point-Contact Transistors. F. L. Hunter and B. N. Slade. *RCA Review*, v. 15, Mar. 1954, p. 121-134.

Characteristics of developmental *p*-type transistors in R.F. amplifier or oscillator applications. Graphs, diagram. 9 ref.

9613* O.N.E.R.A. Radio Alignment. Its Development and Possible Uses in Aeronautics. (French.) J. Zakheim. *Recherche Aéronautique*, 1954, no. 37, Jan.-Feb., p. 39-42.

Apparatus for guidance in a vertical plane, measuring speeds during horizontal flight, and plotting of trajectories. Charts, photographs.

9614* An Electron-Beam Tube for Analog Multiplication. E. J. Angelo, Jr. *Review of Scientific Instruments*, v. 25, Mar. 1954, p. 280-284.

Dynamic measurements show sinusoidal input voltage performance is independent of frequency up to 100 kc. per sec. at output. Graphs, diagrams. 4 ref.

9615 Thermistors: Components for Electronic Control and Measurement. Albert J. Forman. *Tele-Tech*, v. 13, Apr. 1954, p. 72 + 9 pages.

Applies to temperature compensation, automatic gain control, regulation, surge protection, oscillators, and radiation detection. Photographs, diagrams, graphs. 8 ref.

9616 Self-Oscillating UHF Transistors. Hans E. Hollmann. *Tele-Tech*, v. 13, Apr. 1954, p. 75-77.

Oscillations occur exclusively within transistor without external resonator. Photographs, diagrams, graph. 6 ref.

9617 Industrial Applications of Transductors. R. J. Radus. *Tele-Tech*, v. 13, Apr. 1954, p. 78 + 5 pages.

Magnetic amplifiers preserve electrical isolation while metering voltages and currents. Applies to detection of arc-back in Hg rectifiers and over-current detection for selection tripping. Diagrams. 4 ref.

9618 Electric Power for a Synchrocyclotron. Lester Kornblith, Jr. *Tele-Tech*, v. 13, Apr. 1954, p. 98 + 13 pages.

Pulsed FM oscillator using rotating capacitor. Current regulator and remote servo indicator circuit design and performance. Diagrams. 8 ref.

9619* Design of a Commercial Facsimile System. T. F. Cofer. *Western Union Technical Review*, v. 8, Apr. 1954, p. 61-71.

Practical design principles including optical and scanning mechanisms. Photographs. 5 ref.

9620* The Transistor in Hearing Aids. II. Design for Use With RC Couplings Throughout. S. Kelly. *Wireless World*, v. 60, Apr. 1954, p. 159-162.

Coupling configurations and circuit parameters are compared. Practical recommendations. Diagrams, graphs.

9621* Transverse Electromagnetic Effects in Semiconductors. (German.) J. Appel. *Zeitschrift für Naturforschung*, v. 9a, no. 2, Feb. 1954, p. 167-174.

Investigates effects with mixed impulse time and for two-band model on conductivity, resistance, and Hall constants. Graphs. 7 ref.

9622* Theory of Internal Field Emission of Cubic Crystals. (German.) J. Homilius and W. Franz. *Zeitschrift für Naturforschung*, v. 9a, no. 3, Mar. 1954, p. 205-210.

Computation of disruptive strengths of body- and face-centered crystals applied to various semi-conductors. Field strengths indicated. 10 ref.

Books and Miscellaneous Publications

9623 Review of Input and Output Equipment Used in Computing Systems. Joint AIEE-IRE-ACM Computer Conference. 142 p. 1953. American Inst. of Electrical Engineers, N. Y. (QA75 J66r)

Papers cover SEAC, UNIVAC, RAYDAC, and IBM 701 systems and converters for handling tape and cards.

See also:

9104 (tramp iron removal)
9172 (oxide semi-conductors)
9185 (ceramic vacuum tubes)
9755 (electronic data storage and recording)
9828 (predictor servomechanisms)
9882 (magnetic materials for telecommunications)
10127 (semi-conductivity of CdTe and In_2Te_3)
10393 (resins for electrical applications)

ENGINEERING ECONOMICS

9624* Instrument Cost Estimation. Douglas M. Considine and John J. Kennedy. *Chemical Engineering Costs Quarterly*, v. 4, Apr. 1954, p. 32-40.

Flow meter, liquid meter, pressure gage, thermometer, potentiometer, and pyrometer costs overage 6% of total layout expense. Tables.

9625* Steam Generation. Edwin Durham. *Chemical Engineering Costs Quarterly*, v. 4, Apr. 1954, p. 41-63.

Costs of boiler design, fuels, firing, feedwater and treatment, and auxiliaries. Tables, diagrams, photographs, graphs.

9626 How Are We Fixed for Water? Francis Bello. *Fortune*, v. 49, March, 1954, p. 120-125.

An audit of U.S. water resources. Photographs, drawings, table.

9627 Resources for the Chemical Industry in the United States. *Industrial and Engineering Chemistry*, v. 46, Mar. 1954, p. 468-505.

Includes "Chemical Industry", George A. Harrington; "Agricultural Resources", P. Burke Jacobs and R. T. Milner; "Wood Resources", Edward G. Locke and Kenneth G. Johnson; "Mineral and Fuel Resources", Richard J. Lund and David D. Moore; "Water Resources", A. M. Buswell and W. J. Roberts; "Power Resources", F. D. Campbell and A. S. Griswold; "Transportation Resources", Gregoire Gutzeit and Allen Everett; "Labor and Manpower", J. S. Wilson; and "Educational and Research Resources", Maurice Nelles. Tables, maps, graphs, diagrams, photographs. 83 ref.

Engineering Economics

9628 Metalworking's Future Markets. *Iron Age,* v. 173, Apr. 8, 1954, p. M1-M32.

Includes "What the Future Holds for Business", Arno H. Johnson; "New Customers: Five Every Minute", R. W. Burgess; "Copper: Many Factors Will Affect Its Future", Kemp G. Fuller; "Steel: What will Demand, Output be During 1955-1959", B. E. Estes; "Titanium: 4-Year Old Industry Sees Problems, Bright Future", C. I. Bradford and D. W. Kaufmann; "Aluminum: What Will We do With It All?", D. P. Reynolds; "Magnesium: Supply Unlimited, Growth Just Starting", D. T. Surprenant; and "How the Government Can Help You Find Markets", H. W. Ketchum.

9629 Aluminum-Bauxite Reserves and Production. *Light Metal Age,* v. 12, Apr. 1954, p. 20-21, 23, 31.

World statistics and developments.

9630 Trends in Coal Utilization and Their Effect on Coal Marketing. Carroll F. Hardy. *Mining Engineering,* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 199, Mar. 1954, p. 299-303.

Includes tables.

9631* What Does Packaging Cost? *Modern Packaging,* v. 27, Mar. 1954, p. 125-129.

Relative cost-to-sales ratios for 19 industries. Photographs, diagrams, graph.

9632 Realize a Profit From Refinery Coke. E. L. Jones, F. D. Parker, and W. B. Strobel. *Oil and Gas Journal,* v. 52, May 3, 1954, p. 97-101.

Increased profits due to coking; description of acetylene process; advantages of making acetylene from coke; and petrochemical products from coke. Graphs, diagrams. 5 ref.

9633* Resources-Research-Rewards. D. D. Morris. *Western Miner and Oil Review,* v. 27, Mar. 1954, p. 40-44.

Effects of research on mining and metallurgical industries. Economic results of development of new processes in mining and extraction of Pb, Fe, and Zn. Charts.

Books and Miscellaneous Publications

9634 International Trade Statistics. R. G. Allen and J. Edward Ely, editors. 448 p. 1953. John Wiley & Sons. (HF1014 AL54i)

Analyzes practices of individual countries in assembling and publishing their statistics. Includes studies of coverage, commodity classification, valuation, and exchange conversion.

9635* Iron and Steel Industries of the South. H. H. Chapman. 427 p. 1953. Univ. of Alabama, Birmingham. (HD9515 C36i)

Natural resources; location of mines and plants; coal mining and preparation; raw material costs and wages; markets; economic characteristics; trends and potentials.

9636 Tin Production and Resources. F. Stuart Miller. Paper from SYMPOSIUM ON TIN. ASTM SPECIAL TECHNICAL PUBLICATION no. 141. p. 3-24. 1952. American Society for Testing Materials, Philadelphia. (TN793 Am35s)

Nature and distribution of ores, mining methods, and production statistics. Tables. 15 ref.

See also:
9697 (cost of peat fuel)
9880 (economy of special shaped wires)
9903 (costs of steel making)
9951 (economics of steel making)
9978 (cost factors in electric-furnace operation)
10541 (costs of pulping)

FLUID MECHANICS

9637 An Experimental Method for Determining the Drag of a Shock Wave With Application to a Ducted Body. (English.) Lars Öhman. *Aeronautical Research Institute of Sweden, Report no.* 51, 1954, 21 p. (TL526 A82r)

Based on determination of wake behind the shock wave and works from shape of shock obtained by schlieren or shadowgraph methods. Graphs, tables, photograph. 7 ref.

9638* Thermal Convection in Laminar Boundary Layers. II-III. H. J. Merk and J. A. Prins. *Applied Scientific Research,* v. 4, sec. A, no. 3, 1954, p. 195-221.

Refined Squire-Eckert approximation for thermal convection in laminar boundary layers agrees better with rigorous solution due to Schuh. Local heat transfer by an approximation method first introduced by Squire for a flat plate. Graphs, tables. 12 ref.

9639* Application of the Method of Topographic Variables to the Study of Non-Permanent Fluid Movements. (French.) Dimitri Riabouchinsky. *Comptes rendus,* v. 238, no. 6, Feb. 8, 1954, p. 636-638.

Applications to permanent movements of compressible or incompressible fluids: extension to non-permanent movements. 2 ref.

9640 Problems and Results of Investigations on Cascade Flow. Hermann Schlichting. *Journal of the Aeronautical Sciences,* v. 21, Mar. 1954, p. 163-178.

Theory of incompressible flow through two-dimensional cascades of airfoils. Graphs, diagrams, photographs. 26 ref.

9641 Boundary Disturbances in High-Explosive Shock Tubes. R. G. Shreffler and R. H. Christian. *Journal of Applied Physics,* v. 25, Mar. 1954, p. 324-331.

Determine dependence of geometry, energy, and velocity of disturbance on such variables as gas contained in the shock tube, shock strength, roughness, and composition of supporting boundary. Graphs, photographs. 3 ref.

9642 Vortex Flow in Axial Turbo Machines. (English.) Jan R. Schnittger. *Kungl. Tekniska Högskolan Handlingar* (Transactions of the Royal Institute of Technology, Stockholm, Sweden), 1954, no. 74, 61 p. (T4 K96t)

Complete calculations for potential and vortex flow; free scope for design, improving utilization. Tables, graphs, diagrams. 7 ref.

9643*Wave Motions of a Heavy Liquid. (Russian.) M. D. Khaskind. *Prikladnaia Matematika i Mekhanika,* v. 18, no. 1, 1954, p. 15-26.

Solution of spatial problem of floating body oscillations on surface of an infinitely-deep agitated heavy liquid. 7 ref.

9644* The Effect of Rapid Distortion of a Fluid in Turbulent Motion. G. K. Batchelor and Ian Proudman. *Quarterly Journal of Mechanics and Applied Mathematics,* v. 7, Mar. 1954, p. 83-103.

Calculates changes produced in a homogeneous turbulent motion when fluid is subjected to superimposed uniform distortion. Graphs. 7 ref.

9645* Two Dimensional Source Flow of a Viscous Fluid. H. C. Levey. *Quarterly of Applied Mathematics,* v. 12, Apr. 1954, p. 25-48.

Investigates two-dimensional source flow similar to flow in a divergent channel with straight walls. Solutions of physical significance all contain shocks. Graphs, table. 5 ref.

9646 Displacement Effect of a Three-Dimensional Boundary Layer. Franklin K. Moore. *U. S. National Advisory Committee for Aeronautics, Report* 1124, 1953, 5 p. (TL521 Un3r)

Method determines "displacement surface" of a known three-dimensional compressible boundary-layer flow in terms of mass-flow defects associated with the profiles of the two velocity components parallel to the surface. Diagrams, graph. 9 ref.

See also:
9068 (axial flow along cylinders)
9070 (transition-point fluctuations in supersonic flow)
9081 (low density air speed measurement)
9770 (flow meter)

FOOD TECHNOLOGY

9647 A Microbiological Process Discussion. The Use of Antibiotics in Meat Processing. H. H. Weiser, L. E. Kunkle,

and F. E. Deatherage. *Applied Microbiology*, v. 2, Mar. 1954, p. 88-94.
Includes graphs, tables. 13 ref.

9648* Microbiological Deterioration of Fish Post Mortem, Its Detection and Control. H. L. A. Tarr. *Bacteriological Reviews*, v. 18, Mar. 1954, p. 1-15.
Review of pertinent literature. 132 ref.

9649* Processes of Enzyme Synthesis and Decomposition of Starch in Potato Tubers at Various Storage Temperatures. (Russian.) A. N. Petrova, T. T. Bolotina, and A. A. Kobzeva. *Biokhimiia*, v. 19, no. 1, 1954, p. 64-67.
Extracts of tubers stored in heated bins have a weaker separating action than those stored at lower temperatures. Graphs, tables. 5 ref.

9650* Content of Acids in Rye Dough and Bread Prepared by Various Methods. (Russian.) M. I. Kniaginichev, P. M. Plotnikov, Iu. R. Bolkhovitina, K. G. Bazovskaia, and O. V. Proskurina. *Biokhimiia*, v. 19, no. 1, 1954, p. 96-99.
Influence of varied fermentation temperatures, yeast content, and preparation on accumulation of lactic and other acids. Tables. 7 ref.

9651* Transformation of Organic Acids in Damaged Potato Tubers. (Russian.) S. M. Prokoshev and A. K. Minina. *Biokhimiia*, v. 19, no. 1, 1954, p. 104-110.
Change of citric into malic acid. Increase of oxalic acid content detected. Tables, graph. 10 ref.

9652* The Permissibility of Anti-Oxidants in Foodstuffs. (German.) F. D. Tollenaar. *Fette, Seifen, Anstrichmittel*, v. 56, no. 1, Jan. 1954, p. 41-46.
Properties of various anti-oxidants; countries where use is approved and controlled. Tables, graphs. 18 ref.

9653* Antioxidant Effect of Liquid Smokes. Betty M. Watts and Marian Faulkner. *Food Technology*, v. 8, Mar. 1954, p. 158-161.
Four commercial liquid smokes studied; activity varied from zero to a pronounced effect. Smoke and ascorbic acid are shown to function synergistically. Tables. 23 ref.

9654* Preliminary Experiments in the Use of Chlorella as Human Food. Yuji Morimura and Nobuko Tamiya. *Food Technology*, v. 8, Apr. 1954, p. 179-182.
Algal powder increases protein and vitamin content of foods. Tables. 2 ref.

9655* Some Fundamentals of Radiation Sterilization. Radcliffe F. Robinson. *Food Technology*, v. 8, Apr. 1954, p. 191-194.
Recent research studied X-rays, high-voltage electrons or cathode rays, and α-, β-, and γ-rays from fission waste products. 24 ref.

9656* Antibiotics in Food Processing Additives. Accelerating Death of Spores by Moist Heat. J. C. Lewis, H. D. Michener, C. R. Stumbo, and Dudley S. Titus. *Journal of Agricultural and Food Chemistry*, v. 2, Mar. 17, 1954, p. 298-302.
Includes tables, graphs. 26 ref.

9657* Antibiotics in Food Processing. Experimental Preservation of Fish and Beef With Antibiotics. H. L. A. Tarr, John W. Boyd, and H. M. Bissett. *Journal of Agricultural and Food Chemistry*, v. 2, Mar. 31, 1954, p. 372-375.
Spoilage of whole eviscerated fish was retared markedly by ices containing 1 to 4 p.p.m. of chlorotetracycline; by holding six days at −1C in sea water containing two p.p.m.; or by one min. immersion in solutions containing 50 or 100 p.p.m. prior to icing. Tables, photographs. 5 ref.

9658* A Technique for the Approximate Quantitative Prediction of Flat Souring in Canned Peas. G. G. Knock. *Journal of the Science of Food and Agriculture*, v. 5, Mar. 1954, p. 113-119.
Predicted by count of flat-sour spores in unprocessed cans. Cannery process is evaluated in terms of decimal reduction times for flat-sour spores. Graphs, table. 14 ref.

9659 Sterilization of Foods and Other Products. Clyde Williams. *Monthly Business Review*, 1954, Apr., p. 8.
X-irradiation offers some relief to sterilization problems. Experimentation is needed, future possibilities seem promising.

Books and Miscellaneous Publications

9660 Refining of Oils and Fats for Edible Purposes. A. J. C. Anderson. 204 p. 1953. Academic Press, N. Y. (TP670 An22r)
Equipment and processes for removal of impurities and undesired constituents, bleaching, and deodorizing.

See also:
9159 (radiation sterilization of food)

FUELS AND COMBUSTION

9661 Coal and Coke. *American Institute of Mining and Metallurgical Engineers, Proceedings*, v. 12, 1953, p. 158-215.
Includes "Some Aspects of Latin American Coal Reserves", J. D. Price and "Measurement of Gas Pressure Within the Coal Charge in Coke Ovens", Charles C. Russell, Michael Perch, and H. B. Smith.

9662 Present and Future Aspects of Carbonization Research. Harlan W. Nelson and James J. Ward. *American Institute of Mining and Metallurgical Engineers, Proceedings*, v. 12, 1953, p. 182-195; disc., p. 195-197.
Reviews progress of research on availability, treatment, and properties of coking coals; coke ovens and carbonization methods; and coke properties. Outlines subjects for further profitable research. 35 ref.

9663* Brown-Coal Tar Pitch Binders for Briquetting Brown Coal in Order to Permit Their Subjection to High-Temperature Coking. (German.) *Bitumen, Teere, Asphalts, Peche*, v. 5, no. 2, Feb. 1954, p. 49.
Experiments for successful production of high-temperature coke. Table. 6 ref.

9664 The Production of Coke to Blast Furnace Specifications. James A. Beatty. *Blast Furnace and Steel Plant*, v. 42, Mar. 1954, p. 339-344.
Equipment, raw materials, plant layout, and processing techniques. Photographs, tables, diagrams.

9665* Physical and Chemical Factors in the Early Stages of Coke Formation. I. G. C. Dryden and M. Griffith. *British Coal Utilisation Research Association, Monthly Bulletin*, v. 18, Feb.-Mar. 1954, p. 61-86.
Factors influencing plasticity; softening and decomposition points; and mechanisms of softening and swelling. Graph. 180 ref.

9666* Coal as a Source of Chemical Raw Materials. R. Holroyd. *British Coal Utilisation Research Association, Quarterly Gazette, no.* 21, 1953, p. 9-21.
Fields open to coal as a chemical source and competitive position of petroleum. Tables, graphs, diagrams.

9667 The Oxidation, Decomposition, Ignition, and Detonation of Fuel Vapors and Gases. XXIII. The Effect of Flow Configuration: *n*-Pentane and Acetaldehyde in Combustion Tubes of Various Materials. R. O. King, S. Sandler, and R. Strom. *Canadian Journal of Technology*, v. 32, May 1954, p. 102-126.
Includes graphs, tables. 14 ref.

9668* Standardizing Tests Relative to Solid Fuels. (French.) Henry Cassan. *Chaleur & Industrie*, v. 35, no. 344, Mar. 1954, p. 75-88; disc., p. 88.
Purpose of standardization, methods applied, and results obtained in France. Compared with results in other countries. Graph, diagrams.

9669* Total Gasificatoin of Coal Dust. Friedrich Totzek. *Coke and Gas*, v. 16, Mar. 1954, p. 89-96.
Development of Koppers process for making water gas from coal dust. Photographs, diagrams, graph, tables.

Fuels and Combustion

9670* Studies in Coke Formation. R. Cheradame. *Coke and Gas*, v. 16, Apr. 1954, p. 143-149.

Production of metallurgical coke from high-volatile French and Saar coals. Photographs, table, diagram.

9671* The "Carrier-Gas" Process. M. S. Gaskill. *Coke and Gas*, v. 16, Apr. 1954, p. 153-158.

Method of accelerated continuous carbonization carried out in the full-scale test plant at Albion Ironworks, Manchester. Tables.

9672* Measuring Rate of Flame Propagation of Liquid Air-Combustible Mixtures. (French.) Jean Rappeneau. *Comptes rendus*, v. 238, no. 11, Mar. 15, 1954, p. 1192-1194.

Use of blue-cone flames from cylindrical burners. Photographs.

9673* Power From Peat via the Gas Turbine. *Electric Light and Power*, v. 32, Mar. 25, 1954, p. 95-96.

Vast areas of peat throughout northern Great Britain offer solution to problem of supplementing supplies of fuel for power. Photograph, diagram.

9674* The Interferometric Determination of Benzene in Coke Oven Gas. (German.) Wolfram Ohme. *Erdöl und Kohle*, v. 7, no. 2, Feb. 1954, p. 73-77.

Method of determining liquid hydrocarbons. Tables, graphs. 4 ref.

9675* Tricresyl Phosphate in Carbureted Fuels. (German.) Günter Schönwälder. *Erdöl und Kohle*, v. 7, no. 2, Feb. 1954, p. 78-81.

Prevents premature ignition and deposits on spark plugs caused by formation of C-type complexes and Pb compounds. Tables, graphs. 6 ref.

9676* X-Ray Studies of the Ultra-Fine Structure of Coal. I. Low-Angle Scattering of Vitrinite From Coals of Differing Rank. J. B. Nelson. *Fuel*, v. 33, Apr. 1954, p. 153-175.

Selection and preparation of small monoliths having vitrinite bands free from organic and inorganic impurities. Diagrams, graphs, tables, photographs, X-ray diffraction patterns. 45 ref.

9677* Preparation of Industrial Hydrogen by Gasification of Fine Coal. (Japanese.) Shozo Masai. *Fuel Society of Japan, Journal*, v. 33, no. 322, Feb. 1954, p. 61-69.

Compares cost with that for hydrogen produced by Winkler and air, water, and coke-oven gas processes. Diagrams, graphs, tables.

9678* Liquefaction Behind the Iron Curtain. Philip S. Parker and Robert H. Ormston. *Gas Age*, v. 113, Mar. 11, 1954, p. 29-32.

Complete details of natural gas in the U.S.S.R. including pipelines; liquefaction and regasification plants; and storage facilities. Table, diagrams.

9679* Accelerated Continuous Carbonization. The 'Rochdale' Process. T. Nicklin and M. Redman. *Gas Journal*, v. 277, Mar. 17, 1954, p. 665-681; disc., p. 681-686.

Methods of gas production reviewed in light of production costs. Tables, diagrams, graph.

9680* Instruments for Recording Regasification Process of Solid Fuels. (German.) Heinrich Echterhoff. *Glückauf*, v. 90, nos. 11-12, Mar. 13, 1954, p. 318-321.

A tube furnace and scale for recording loss of weight as function of time and temperature. Photographs, tables, graphs.

9681 Flame-Stability Studies on Shielded Bunsen Burners. Philip F. Kurz. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 746-754.

Investigates stability limits of laminar flames on Bunsen burners shielded to exclude ambient atmospheric air. Diagrams, graphs, table. 8 ref.

9682 Coal Burning Equipment. Application and Selection. Earle C. Miller. *Industry and Power*, v. 66, Apr. 1954, p. 66-71.

Efficiencies of various methods of firing. Photograph, tables, diagrams. 4 ref.

9683* A Gravimetric Method of Gas Analysis. (Swedish.) J. Morsing. *Jernkontorets Annaler*, v. 138, no. 3, 1954, p. 142-158.

Simultaneous determination of H_2S, CO_2, O_2, H_2, CO, CH_4, C_2H_6, N_2, and unsaturated hydrocarbons. Tables, diagrams, photograph. 20 ref.

9684 Ignition and Combustion in a Laminar Mixing Zone. Frank E. Marble and Thomas C. Adamson, Jr. *Jet Propulsion*, v. 24, Mar.-Apr. 1954, p. 85-94.

Ignition and combustion in laminar mixing zone between a cool combustile mixture and a stream of hot combustion products moving in parallel. Graphs, diagrams. 10 ref.

9685 High-Frequency Combustion Instability in Solid Propelant Rockets. II. Sin-I Cheng. *Jet Propulsion*, v. 24, Mar.-Apr. p. 102-109.

Theory of unstable H.F. oscillations in solid propellant rocket is advanced with mechanism of self-excitation based on simplified model. Graphs.

9686 Theory of Linear Flame Propagation. I. Existence, Uniqueness, and Stability of the Steady State. II. Structure of the Steady State. David Layzer. *Journal of Chemical Physics*, v. 22, Feb. 1954, p. 222-232.

Includes table. 9 ref.

9687 Theory of Ignition Considered as a Thermal Reaction. Bruce L. Hicks. *Journal of Chemical Physics*, v. 22, Mar. 1954, p. 414-429.

History of a family of exothermally reactive solids is studied with theoretical mathematics. Graphs, tables. 15 ref.

9688 Frontiers in Heat Extraction From the Combustion Gases of Coal. Elmer R. Kaiser. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Mar. 1954, 304-313.

Includes tables, diagrams, graphs. 42 ref.

9689 Atomization of Liquid Fuels as Related to the Overall Operation of Open Hearth Furnaces. G. C. Primm. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 177-179; disc., p. 179-180.

Methods of obtaining desired flame characteristics. Concludes that use of gas or air as atomizing agents is better than change in design of burners and atomizers. Table.

9690* Gasoline Additives. C. O. Tongberg, N. V. Hakala, L. E. Moody, and J. B. Patberg. *Petroleum Times*, v. 58, Mar. 19, 1954, p. 287-289, 291-295.

Review of pre-ignition and spark plug fouling. Tables. 13 ref.

9691* Residual Fuels Challenge Diesel Users. J. Bryan Sims. *Plant*, v. 9, Mar. 1954, p. 37-42.

Trends, various types of available fuels, proper handling of the heavy residuals, wear-causing contaminants, and additives. Photographs, tables, graphs.

9692* Frontiers of Extracting Heat From Coal. Elmer R. Kaiser. *Plant*, v. 9, Mar. 1954, p. 55-59, 84.

General view of factors important in efficient heat liberation and recovery in modern boilers. Graphs.

9693* Utilization of a Pulsoreactor for Fast Classification of Fuels. (French.) M. Barrére, J. Rappeneau, and H. Moutet. *Recherche Aéronautique*, 1954, no. 37, Jan.-Feb., p. 21-28.

Influence of chemical composition of heptane, gasoline, kerosene, ethyl alcohol, and acetone on specific consumption of engine and yield of the fuel. Diagrams, graphs, photographs, table. 8 ref.

9694* Coking of Fuel Oils. (Italian.) G. Salvi. *Revista dei Combustibili*, v. 8, no. 1, Jan. 1954, p. 25-44.

Characteristics of coking fractionation; Blaw-Knox decarbonizing process; delayed, continuous contact, and fluid coking; and various economic problems. Diagrams, tables, photographs, graphs. 8 ref.

9695* Carbonization Process for Coal. (Italian.) C. Manci. *Rivista dei Combustibili*, v. 8, no. 2, Feb. 1954, p. 153-158.

Use of coals having low coking power for production of domestic and industrial coke. Diagram.

9696 Flame Propagation: The Effect of Pressure Variation on Burning Velocities. Alfred Egerton and A. H. Lefebvre. *Royal Society, Proceedings*, v. 222, ser. A, Mar. 9, 1954, p. 206-223 + 4 plates.

Burning velocity of mixtures of methane, propane, ethylene, and propylene with air were determined under constant-pressure conditions in a tube of rectangular section at pressures from ½ to 9 atmospheres. Tables, graphs, photographs, diagrams. 30 ref.

9697* Reducing the Cost of Peat Fuel. (Russian.) M. M. Lanevskii. *Torfianaia Promyshlennost*, v. 31, no. 2, 1954, p. 17-19.

General suggestions for rationalizing application of harvesting machines, labor forces, and accounting methods. Tables.

9698 Bibliography of Bureau of Mines Investigations of Coal and Its Products, 1945 to 1950. E. P. Carman, M. Opperman, S. Nishiyama, and L. Racoosin. *U. S. Bureau of Mines Bulletin* 528, 1954, 60 p. (TN21 Un3b)

Covers analysis, tests, properties, structure, occurrence, preparation, mining, carbonization, gasification, liquefication, hydrogenation, and combustion. 821 ref.

9699 Low-Temperature Carbonization Assay of Coal in a Precision Laboratory Apparatus. John B. Goodman, Manuel Gomez, V. F. Parry, and W. S. Landers. *U. S. Bureau of Mines Bulletin* 530, 1953, 24 p. + 6 plates. (TN21 Un3b)

Mild-steel retort of improved design; accurately controlled method of heating; and complete collection and condensation system for the solid, liquid, and gaseous products of carbonization. Tables, graphs, diagrams, photographs. 33 ref.

9700 Gasification of Pulverized Coal With Steam and Oxygen at Atmospheric Pressure. G. R. Strimbeck, J. B. Cordiner, Jr., N. L. Baker, J. H. Holden, K. D. Plants, and L. D. Schmidt. *U. S. Bureau of Mines, Report of Investigations* 5030, Feb. 1954, 37 p. + 31 plates. (TN21 Un3r)

Pilot-plant tests of a strongly coking Sweeckley-bed coal. Graphs, tables, photographs, diagrams. 12 ref.

9701 Storage of Low-Rank Coals. R. R. Allen and V. F. Parry. *U. S. Bureau of Mines, Report of Investigations* 5034, Feb. 1954, 31 p. + 41 plates. (TN21 Un3r)

Spontaneous combustion of reactive coal avoided by thorough compaction and preventing segregation. Diagrams, tables, photographs.

9702 The Thermodynamics of Combustion Gases: Temperatures of Acetylene-Air Flames. R. W. Smith, Jr., John Manton, and S. R. Brinkley, Jr. *U. S. Bureau of Mines, Report of Investigations* 5035, Feb. 1954, 14 p. (TN21 Un3r)

Study of fuel-oxidant systems. Tables. 11 ref.

9703* Investigation of Conditions of Ignition of Gas Mixtures. XXIII. Oxidation of Ethane. (Russian.) M. I. Gerber and M. B. Neiman. *Zhurnal Fizicheskoi Khimii*, v. 27, no. 10, Oct. 1953, p. 1572-1579.

Kinetics of accumulation of intermediate products, aldehydes, and peroxides. Diagram, graphs, tables. 21 ref.

9704* Semi-Coking of Brown Coals Under Pressure. (Russian.) A. D. Kokurin and O. A. Krylov. *Zhurnal Prikladnoi Khimii*, v. 26, no. 11, Nov. 1953, p. 1195-1199.

Pressure applied in semi-cooking increases gas yield and decreases semi-coke, tar, and dissociation water in laboratory equipment. Tables, diagram.

9705* Reaction Order of Gasification of Coal by Water Vapor. (Russian.) N. M. Ershova. *Zhurnal Prikladnoi Khimii*, v. 27, no. 1, Jan. 1954, p. 106-109.

Reaction proceeds along first order as determined by active concentration of H_2O. Diagrams, tables, graphs.

Books and Miscellaneous Publications

9706 The Atomisation of Liquid Fuels. E. Griffen and A. Muraszew. 246 p. 1953. John Wiley & Sons. (TP343 G36a)

Disintegration of jets; fuel spray characteristics; effect of injection pressure; and properties of the gaseous medium.

9707 Coal Briquetting Conference, Proceedings. v. III. 106 p. 1953. Natural Resources Research Inst., University of Wyoming, Laramie.

Includes "Aims of the Briquetting Conference", Neal Rice; "Fundamental Aspects of Coal Briquetting", N. Berkowitz; "Briquetting Binder", J. G. Miller and Roland Vokac; "The Parry Dryer", P. S. Grant and R. L. Morrison; "Briquetting Properties of Fluidized Chars", W. S. Landers and V. F. Parry; "The Maintenance of Briquetting Machinery", L. A. Woodward; "Low Temperature Carbonization and Briquetting of Sub-Bituminous Coal in New Zealand", Allan B. Jones; "Practical Evaluation of Locomotive Briquettes", W. A. Vanderland; "Report on Physical Tests Used by Operating Briquetting Plants", Edward Prostel; "Present Status and Recent Developments of the German Fuel Briquetting Industry", L. von Szeszich, Hermann Meyer, and Heinrich Hirz; "Problems of the Coal Briquetting Industry in Japan"; "Industrial Briquetting", Paul D. Haigh and K. Richard Komarek; "Cleaning Coal for Briquetting", Ralph J. Lofquist; and "An Evaluation of Low Temperature Char Agglomerates for Metallurgical Use", Nels E. Sylvander and Donald R. Lindahl.

See also:
9182 (fuel efficiency in tunnel kilns)
9928 (combustion in open-hearth furnaces)
9929 (combustion in open-hearth furnaces)
9930 (combustion control in steel furnaces)
9947 (gas generators for steel mills)

GEOLOGY AND MINERALOGY

9708 Technology in Petroleum Conservation. David D. Moore. *Battelle Technical Review*, v. 3, Mar. 1954, p. 28-31.

Dynamic growth of oil industry during past 25 yr. Role of geology, geophysics, and geochemistry. Increased recovery of crude oil. Secondary recovery methods. Graph.

9709* Mineralogical Cycle of Uranium. (French.) Pavle Savitch and Stoyan Pavlovitch. *Comptes rendus*, v. 238, no. 8, Feb. 22, 1954, p. 912-914.

Distribution, concentration, and formation of U ore in earth's crust. Table.

9710* Investigation of Bitumens by Infrared-Absorption Spectra. (Russian.) E. A. Glebovskaia and A. A. Zakharov. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 865-868.

Investigates about 200 fractions of bitumens of different genetic phases from various deposits. 5 ref.

9711* Investigation of the Degree of Perfection of a Crystal by Means of Polarized X-Rays. S. Ramaseshan and G. N. Ramachandran. *Indian Academy of Sciences, Proceedings*, v. 39, sec. A, Jan. 1954, p. 20-30.

Investigates intensity of Bragg reflection when incident X-rays are polarized and azimuth of electric vestor is varied with respect to plane of reflection. Tables, graphs, diagram. 11 ref.

9712* Nuclear Geochemistry. A New Field of Investigation. (Russian.) N. S. Boganik. *Izvestiia Akademii Nauk SSSR, Seriia Geologicheskaia*, 1953, no. 6, Nov.-Dec., p. 54-66.

Establishes the fact the nuclear transformations take place under natural conditions, opening a new field for research. Table. 66 ref.

9713* Some Plane Problems in the Theory of Gas Filtration in a Coal Seam. (Russian.) P. Ia. Polubarinova-Kochina. *Prikladnaia Matematika i Mekhanika*, v. 18, no. 1, 1954, p. 3-14.

Applies method of conformal mapping of regular gas movements. Diagrams, graphs. 4 ref.

Geology and Mineralogy

9714* The Use of Photologs of Microfacies in Hardened Series Cut Through by the Drill. (French.) M. Rey. *Revue de l'institut francais du petrole et Annales des combustibles liquides*, v. 9, no. 2, Feb. 1954, p. 39-41 + 9 plates.

Method permits comparison with electric log for correlation between wells. Graphs, micrographs.

See also:
10296 (measuring of geologic time)

GEOPHYSICS

9715 The Natural Distribution of Tritium. Sheldon Kaufman and W. F. Libby. *Physical Review*, v. 93, ser. 2, Mar. 15, 1954, p. 1337-1344.

Abundance of cosmic-ray-produced tritium was measured in variety of natural waters in the Mississippi Valley, Chicago area, and elsewhere in northern hemisphere. Applications of natural tritium to problems of hydrology and meteorology. Tables, graph. 20 ref.

9716* Meteorological Services for the Comet. E. Chambers. *Royal Aeronautical Society, Journal*, v. 58, Mar. 1954, p. 173-184.

Importance in forecasting surface wind, pressure, and temperature for take-off, upper winds, and terminal weather. Table, charts, photographs.

9717 A Discussion on the Floor of the Atlantic Ocean. *Royal Society, Proceedings*, v. 222, ser. A, Mar. 18, 1954, p. 287-429 + 4 plates.

Includes "Introduction", E. C. Bullard; "Recent Advances in Deep-Sea Sedimentology", Ph. H. Kuenen; "The Determination and Significance of Past Temperature Changes in the Upper Layer of the Equatorial Atlantic Ocean", J. D. H. Wiseman; "High-Velocity Turbidity Currents, a Discussion", F. P. Shepard; "The Characteristics of Some Lower Palaeozoic Marine Sediments", O. T. Jones; "Remarks on Pebbles From the Deep Atlantic and on the Structure of the English Channel", W. B. R. King; "The Deepest Sounding in the North Atlantic", J. Lyman; "Laboratory Measurements of Seismic Velocities in Ocean Sediments", A. S. Laughton; "Geological Hypotheses and the Earth's Crust Under the Oceans", H. H. Hess; "Seismic Observations in the Eastern Atlantic, 1952", M. N. Hill and A. S. Laughton; "Seismic Refraction Work by H. M. S. *Challenger* in the Deep Oceans", T. F. Gaskell; "Crustal Structure Beneath Oceanic Islands", G. P. Wollard; "The Indo-Atlantic Median Seismic Zone", (French.) J. P. Rothé; "Gravity Measurements and Oceanic Structure", B. C. Browne; "The Geological Evidence on the Nature of Ocean Floors", G. M. Lees; "A Comparison of Oceans and Continents", E. C. Bullard; and "The Flow of Heat Through the Floor of the Atlantic Ocean", Edward Bullard.

9718* Factors Affecting Vertical Temperature Gradients in the Upper Layers of the Sea. Eugene C. LaFond. *Scientific Monthly*, v. 78, Apr. 1954, p. 243-253.

Gradients result from energy transfer at sea surface and from advective processes below the surface. Diagrams. 10 ref.

Books and Miscellaneous Publications

9719 Fresh Water From the Ocean. Cecil B. Ellis. 217 p. 1954. Ronald Press, N. Y. (Td477 E159f)

Investigates possibilities of large-scale, low-cost extraction for cities, industry, and irrigation. Plant construction, operating labor, maintenance, raw materials, and power are analyzed on basis of 1,000 million gallons per day capacity.

9720 Fundamentals of Limnology. Franz Ruttner. 242 p. 1953. Univ. of Toronto Press. (QH96 R93gtr). (Translated from the German by D. G. Frey and F. E. J. Fry.)

Principles of hydrobiology pertaining to fresh water bodies. Includes physical conditions; transformations of dissolved substances; and biotic communities in lakes, bogs, and running water.

GRAPHIC ARTS

9721* Control of Printing Quality. David M. Smith. *Graphic Arts Monthly*, v. 26, Apr. 1954, p. 66 + 4 pages.

Three possible means of control are human judgment, instrumentation, or a combination of these two.

9722* Second International Conference of Printing Research Institutes. *International Bulletin for the Printing and Allied Trades*, 1954, no. 67, p. 3-59.

Includes "The Printability of Paper", Gösta E. Carlsson; "A Review of Printability Work", S. R. C. Poulter; "The Physical Relationship Between Paper and Ink", I. Olsson and L. Pihl; "Porosity in Relation to Printability Tests", D. Tollenaar; "Penetration of Ink Into Paper", I. Olsson and L. Pihl; "Measuring the Smoothness and the Surface Hardness of Paper", E. E. Andersen and C. W. Christensen; "The Optical Properties of Paper", V. G. W. Harrison; "Influence of Strength and Mechanical Properties on Printability", Börje Steenberg; "Dimensional Stability of Paper and Humidity", A. Arnamo; "New Method for Testing Surface Strength of Paper", A. Arnamo, I. Olsson, and L. Pihl; "The Influence of Chemical Residues in Paper on Printability", R. R. Coupe; "Measuring the Printing Quality of Newsprint", G. Larocque, B. Axelrod, and S. Clark; "Testing the Printability of Newsprint", I. Olsson and L. Pihl; "The Problem of Measuring the Uniformity of Newsprint Quality by Electronic Methods", C. Bendtsen; and "What Can the Paper Maker Do to Improve the Printability of Paper?", Otto Brauns.

9723 Photosensitive and Phototropic Products of Solid State Reaction Between Silver Sulfide and Mercuric Iodide. Lawrence Suchow and George R. Pond. *Journal of Physical Chemistry*, v. 58, Mar. 1954, p. 240-242.

Experimental results. Graph, tables.

9724* Investigation of Elasto-Plastic-Viscous Properties of Printing Inks. (Russian.) L. A. Kozarovitskii and S. Ia. Shalyt. *Kolloidnyi Zhurnal*, v. 15, no. 6, Nov.-Dec. 1953, p. 437-441.

Comparison of shear breaking point on Veiler-Rebinder instrument and conical plastometer. Tables, graphs. 9 ref.

9725 Trouble-Shooting in the Press Room. Federico Strasser. *Modern Industrial Press*, v. 16, Apr. 1954, p. 56, 58.

How to avoid sticking of small slugs in die-plates. Diagrams.

9726 Monochromatic Camera for Photography in the Far Ultraviolet. W. E. Behring, J. M. Jackson, S. C. Miller, Jr., and William A. Rense. *Optical Society of America, Journal*, v. 44, Mar. 1954, p. 229-231.

Camera uses two gratings mounted in Wadsworth-type arrangements so that dispersions neutralize. Photograph, graph, diagrams. 5 ref.

9727 Aniline Inks. A. H. Soane. *Paint Manufacture*, v. 24, Mar. 1954, p. 89-91.

Volatile inks applied from a rubber stereo; printing process using these materials; their formulation; current difficulties; and methods of manufacture and testing. Photograph.

9728* Photon. Sidney James Paine. *Printing Equipment Engineer*, v. 84, Mar. 1954, p. 59-64.

What it is; how it is operated. Makes justified type matter on film for printing plates. Photographs.

9729* Traces of Gold in Photographic Emulsions. (German.) Robert Koslowsky. *Umschau in Wissenschaft und Technik*, v. 54, no. 7, Apr. 1, 1954, p. 193-194.

Au impurities in Ag-halide crystals were shown to quadruple sensitivity of the crystals. Graph, micrographs. 7 ref.

9730* Nature of Light-Sensitive Centers of Photographic Emulsions. (Russian.) K. V. Chibisov. *Uspekhi Khimii*, v. 22, no. 10, 1953, p. 1226-1244.

Related changes in light-sensitivity, growth of fog, and formation of Ag during emulsion developing. Role of S compounds and physical state of Ag centers of light sensitivity. Graphs, tables. 46 ref.

9731* The Role of Oxidation Products in Developing. II. (German.) E. Brauer and H. Staude. *Zeitschrift für Elektrochemie*, v. 58, no. 2, 1954, p. 129-135.

Experiment proves effect of oxidation products in photographic development is due to fact that they serve as adsorption agents for the developers proper. Diagram, tables, graph. 14 ref.

See also:
9762 (electron microscopy of photographic grains)
9872 (etching of printing plates)
10543 (paper smoothness)

HEAT POWER

9732 The Development of High-Output Free-Piston Gas Generators. R. A. Lasley and F. M. Lewis. *ASME, Transactions*, v. 76, Apr. 1954, p. 453-461; disc., p. 462.

Progress in development of generators for naval-propulsion purposes. Construction and operating characteristics of various models. Diagrams, graphs.

9733 Liquid Cooling. J. L. Koffman. *Automobile Engineer*, v. 44, Feb. 1954, p. 69-74.

Development of coolant systems for engines of heavy commercial vehicles. Graphs, diagrams. 5 ref.

9734 Engine Research. *Automobile Engineer*, v. 44, Mar. 1954, p. 115-121.

Problems of internal combustion engine design at British Laboratories. Photographs, drawings.

9735 Glass-Plastic Blade Passes 100-Hr. Test. Irving Stone. *Aviation Week*, v. 60, Apr. 5, 1954, p. 43-46.

Relates properties of materials for turbojet compressor blades. Photographs, graphs, diagram.

9736 Gas Turbines for the Steel Industry. George H. Krapf. *Blast Furnace and Steel Plant*, v. 42, Apr. 1954, p. 444-447, 450.

Promises lower operating and investment costs; lower area and water requirements; and simplicity of operation. Diagrams, graph.

9737 Pulsation-Induced Vibration in Utility Steam Generation Units. Raymond C. Baird. *Combustion*, v. 25, Apr. 1954, p. 38-44.

Solution to severe vibration problem in superheater-economizer duct of large boiler. Photographs, diagrams, graphs, table. 5 ref.

9738 New Bark Burning Boiler for the Hollingsworth & Whitney Company. A. B. Stickney. *Combustion*, v. 25, Apr. 1954, p. 57-60.

Preparation of bark, processing in plant, and techniques of burning on high-set spreader stoker. Diagrams, photographs.

9739* Gas Turbines for Power Generation. (German.) H. Pfenninger. *Elektrotechnische Zeitschrift*, v. 6, Ausgabe B, no. 3, Mar. 21, 1954, p. 61-66.

Development, principles, and description of several notable turbines now in use. Graphs, diagrams, tables, photographs.

9740* Lightweight Portable Gas Turbine. *Engineering*, v. 177, Apr. 16, 1954, p. 507-509.

A 60 brake h.p. industrial unit. Photgoraphs, diagram.

9741* Combustion and Formation of Deposits in Diesel Engines. (German.) Fritz Jostes. *Erdöl und Kohle*, v. 7, no. 3, Mar. 1954, p. 160-162.

Meurer's concept of combustion process in diesel engines. Experiments with additives to reduce deposits. Micrgoraphs, tables. 6 ref.

9742 Modern Industrial Boiler Plant. W. P. C. Ungoed. *Iron and Steel Institute, Journal*, v. 176, Mar. 1954, p. 283-291.

Planning of a boiler extension with typical works requirements for process steam and power. Tables, graphs, diagrams.

9743* British Lead With Navy Gas Turbine. C. Morgan Jones. *Marine Engineering*, v. 59, May 1954, p. 54-61.

Developed for use in fast naval craft, new turbine has successfully passed final acceptance trials. Photographs, diagrams.

9744 Vapor Phase Engine Cooling. Lloyd C. Harbert. *Petroleum Refiner*, v. 33, Apr. 1954, p. 127-131.

Design, operation, and advantages including inherent temperature control, no circulating water pumps, reduced engine wear, and cheap steam supply. Diagrams, photograph, tables, graphs. 2 ref.

9745* Ash Separation the Key to Coal-Burning Turbine Progress. *Railway Age*, v. 136, Apr. 19, 1954, p. 44-47.

Includes diagrams, photographs, table.

9746* Thermal Protection of Combustion Chambers of Powder Rockets. (French.) P. Deriaz. *Recherche Aéronautique*, 1954, no. 37, Jan.-Feb., p. 29-32.

Uses of refractory linings. Scale of temperatures reached during operation. Tables, graphs, diagram.

9747* Influencing the Oil-Ash Deposition in Industrial Gas Turbine Plants by Controlling Combustion. (German.) Peter T. Sulzer. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 2, Feb. 1954, p. 33-41.

Reduction of wear and corrosion of turbine blades and parts by ash dpeosits, carbon, and chemical compounds. Photographs, graphs, tables, micrographs. 3 ref.

9748 One-Dimensional Analysis of Choked-Flow Turbines. Robert E. English and Richard H. Cavicchi. *U. S. National Advisory Committee for Aeronautics, Report* 1127, 1953, 18 p. (TL521 Un3r)

Six criteria aid in establishing which blade rows are choked and which are not. Graphs.

9749 Analog Study of Interacting and Noninteracting Multiple-Loop Control Systems for Turbojet Engines. George J. Pack and W. E. Phillips, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3112, Mar. 1954, 33 p. (TL570 Un3t)

Investigates several turbojet control configurations. Graphs, diagrams. 4 ref.

9750* Experience With Use of Shutter Ash Catchers for Preventing Wear of Heating Surfaces. (Russian.) N. G. Zalogin and A. M. Sergeev. *Vestnik Mashinostroeniia*, v. 34, no. 2, Feb. 1954, p. 31-38.

Construction and compaartive data with and without fly ash catcher. Diagrams, table.

See also:
9265 (analysis of engine exhaust gases)
9625 (cost of steam generation)
9642 (flow in turbo machines)
9673 (peat for gas turbine fuel)
9692 (heat liberation and recovery in boilers)
9805 (oils for gas turbine lubrication)
10035 (design for boiler parts)

INFORMATION—PREPARATION AND DISSEMINATION

9751 How Five-Channel Punched Tape Mechanizes Office Jobs. Wells Norris. *American Business*, v. 24, Mar. 1954, p. 10-12, 36.

Equipment and operating characteristics. Photographs.

9752 Can Translation Be Mechanized? Yehoshua Bar-Hillel. *American Scientist*, v. 42, Apr. 1954, p. 248-260.

Shows possible difficulties faced by electronic translation of German and Russian. 4 ref.

9753* The Application of Designed Experiments to the Card Translator. C. B. Brown and M. E. Terry. *Bell System Technical Journal*, v. 33, Mar. 1954, p. 369-398.

Application and method of analysis of data and resulting conclusions. Tables, graphs. 7 ref.

9754 Engineers Can Write Better. The Long and Short of It. II. H. J. Tichy. *Chemical Engineering Progress*, v. 50, Apr. 1954, p. 206-213.

Includes graphs. 6 ref.

Information—Preparation and Dissemination

9755* Bibliography on Data Storage and Recording. Gerhard L. Hollander. *Communication and Electronics*, 1954, Mar., p. 49-58.

Contains 330 titles and abstracts applicable to fields of data storage, recording, analogue-to-digital conversion, data presentation, and telemetering.

9756* Anyone Can Make a Good Speech. Margaret L. Jones. *Dun's Review and Modern Industry*, v. 63, Apr. 1954, p. 61 + 6 pages.

Tips for the speaker in which elocution lessons or oratorical talent are not involved. Photographs.

Books and Miscellaneous Publications

9757* Abstracting and Indexing Sources for Literature on Metals and Metal Fabrication. Ellis Mount. Bibliography no. 2. 24 p. 1953. John Crerar Library, Chicago. (ZTN665 M86a)

Selective list of 45 current indexing and abstracting services. 3 ref.

See also:
9623 (equipment for computer systems)

INSTRUMENTATION AND LABORATORY APPARATUS

9758* Determination of Thickness of Anodic Coatings by Gravimetric Method. (Italian.) A. Prati. *Alluminio*, v. 23, no. 1, Jan. 1954, p. 7-22.

Control by statistical analysis of a series of determinations. Tables, graphs. 4 ref.

9759* Development of a Practical Process of Determining the Transverse Elastic Strain of Test Bars With Measuring Springs. I. (German.) W. Kuntze. *Archiv für technisches Messen*, 1954, no. 218, Mar., p. 65-66.

Measuring-spring arrangement, geometry of system, method of computing transverse strain, and use of the device. Diagrams.

9760* A Shock Tester for Small Apparatus. F. W. Stubner. *Bell Laboratories Record*, v. 32, Mar. 1954, p. 98-101.

Instrument tests mechanical shock damage to electrical apparatus. Graphs, oscillograms, diagrams, photographs.

9761 Development of Steelworks Instruments. D. W. Gillings. *Blast Furnace and Steel Plant*, v. 42, Apr. 1954, p. 434-442.

Prseent and future lines of development in instrumentation. Graphs, photographs, diagrams. 17 ref.

9762* An Evaporated Carbon Replica Technique for Use With the Electron Microscope and Its Application to the Study of Photographic Grains. D. E. Bradley. *British Journal of Applied Physics*, v. 5, Mar. 1954, p. 96-97.

Includes micrographs. 3 ref.

9763 A Survey of Gauges for Measurement of Low Absolute Gas Pressures. Richard B. Lawrance. *Chemical Engineering Progress*, v. 50, Mar. 1954, p. 155-160.

Gages for the range from 760 to 10^{-7} mm. Hg. Diagrams. 10 ref.

9764 An Ionizaiton Manometer and Control Unit for Extremely Low Pressures. P. A. Redhead and L. R. McNarry. *Canadian Journal of Physics*, v. 32, Apr. 1954, p. 267-274.

A Bayard-Alpert type ionization manometer for measurement of pressures to 10^{-10} mm. of Hg. Methods for increasing sensitivity. Diagrams, graphs. 4 ref.

9765* A Tungsten Resistance Thermometer. F. R. Sias, J. R. MacIntyre, and A. Hansen, Jr. *Communication and Electronics*, 1954, Mar., p. 66-69.

Performance of a W resistance thermometer calibrated and adjusted by a unique method. Graphs, diagrams, photograph. 2 ref.

9766 The Measurement of Very Small Direct Currents. M. W. Jervis. *Electronic Engineering*, v. 26, Mar. 1954, p. 100-105.

Reviews methods used, particularly thermionic and capacitor modulator electrometers. Diagrams, graph. 32 ref.

9767* Recording Signals From Resistance Strain Gauges. I. Introduction and Galvanometer Design. II. Operation of Wire Resistance Strain Gauges at High Power Dissipation. D. A. Senior. *Engineer*, v. 197, Mar. 19, 1954, p. 410-413; Mar. 26, 1954, p. 446-449.

Gauges show no sign of mechanical breakdown at power dissipations of one watt on ¼ in. steel sheet. Power ratings permit recording of dynamic strains by galvanometers without recourse to amplifiers. Diagrams, graphs. 2 ref. (To be continued.)

9768* Recording Signals From Resistance Strain Gauges. III. A Twelve-Channel Direct Strain Recorder. D. A. Senior. *Engineer*, v. 197, Apr. 2, 1954, p. 482-483.

Employs twelve galvanometers, each covering a frequency range from zero to 55 cycles per sec.; a recorder control unit; and a power unit. Photographs, diagrams.

9769* Design for an Embedded Thermocouple. D. E. Upton. *Engineering*, v. 177, Apr. 16, 1954, p. 489.

Possibilities of mineral-insulated base-metal thermo-couple wire contained in a metal sheath. Units are steam tight. Diagrams.

9770 Pipe Tee Fluid Flowmeter. Leo Garwin and Spencer H. Landes. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 665-669.

Materials, design, operating characteristics, and applications. Tables, diagrams, graphs. 10 ref.

9771 Radioactive Materials in Prevention of Mold Growth in Optical Instruments. Sigmund Berk and Leonard Teitell. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 778-784.

Includes tables, diagrams, graph, photographs, micrograph. 21 ref.

9772 Use and Maintenance of Oscilloscopes. Jay Dobrin. *Instruments and Automation*, v. 27, Mar. 1954, p. 449-451.

Five uses of oscilloscope permit a wide variety of important applications. Gives service procedure. Photograph, diagrams. 7 ref.

9773 Precise Measurements With Bingham Viscometers and Cannon Master Viscometers. J. F. Swindells, R. C. Hardy, and R. L. Cottington, *Journal of Research, National Bureau of Standards*, v. 52, Mar. 1954, p. 105-120.

All corrections applicable to measurements with these instruments were critically examined. Tables, graphs, diagrams. 16 ref.

9774 A Submersible Photoelectric Absorptiometer. L. J. Scragg, R. Briggs, and G. Knowles. *Journal of Scientific Instruments*, v. 31, Mar. 1954, p. 75-77.

Measures turbidity in rivers. Diagrams, graphs. 2 ref.

9775 A Simple Thermionic Vacuum Gauge. G. K. T. Conn and H. N. Daglish. *Journal of Scientific Instruments*, v. 31, Mar. 1954, p. 95-96.

Gage is simple and easy to construct. Diagrams. 9 ref.

9776 The Behaviour of Standard Cells in Conditions Which Include the Generation of Appreciable Current. L. Hartshorn and Freda A. Manning. *Journal of Scientific Instruments*, v. 31, Apr. 1954, p. 115-118.

Flows of 1 to 10 μ amp. can be drawn from cells for several weeks, after which the "steady-state" potential is regained in a proportional time. Graphs, tables.

9777 A Portable Photometer for the Testing of Reflective Road Signs. R. G. Giovanelli. *Journal of Scientific Instruments*, v. 31, Apr. 1954, p. 126-129.

Photometer is suitable for road signs and retro-reflectors. Results agree with other tests. Graphs, photograph, diagrams.

9778 A Thermistor McLeod Gauge for a Pressure Range 1-10^{-7} mm of Mercury. R. S. Bradley. *Journal of Scientific Instruments*, v. 31, Apr. 1954, p. 129-130.

A thermistor is sealed in the capillary of a McLeod gage. Uses a simple electric circuit. Diagrams, graph. 4 ref.

9779 A Fully Automatic Recording Densitometer for Scanning Paper Electrophoresis Patterns. D. J. R. Laurence. *Journal of Scientific Instrumnets*, v. 31, Apr. 1954, p. 137-138.

Depends on a photomultiplier operated at constant anode current. Diagrams, graph. 5 ref.

9779a Time Microscopy. *Machinery (London)*, v. 84, Apr. 2, 1954, p. 701-704.

Slow motion camera employed in investigation of cutting actions of tools and cutters. Photographs.

9780 Using Optical Measurements in Engineering. Nisson A. Finkelstein. *Mechanical Engineering*, v. 76, Apr. 1954, p. 321-326.

High-precision optical instruments for wide industrial applications. Diagrams, photographs, spectrogram.

9781 Design and Construction of Needle Thermocouples. W. Gerard Rauch. *Metal Progress*, v. 65, Mar. 1954, p. 71-74.

Couples having high thermo-elastic power, hold their calibration well at temperatures up to 1110 F. Graphs, photograph.

9782* Recent Developments in Electron Microscopy. Joseph J. Comer. *Mineral Industries*, v. 23, no. 6, Mar. 1954, p. 1, 3-5, 8.

Includes micrographs. 9 ref.

9783 Electron-Optical Method for Imaging Objects With Magnetic Nonhomogeneities. G. V. Spivak, N. G. Kanavina, I. N. Chernyshev, and I. S. Sbitnikova. *National Science Foundation Translation, no.* 202, Feb. 1954, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 92, no. 3, Sept. 21, 1953, p. 541-543.)

Previously abstracted from original.

9784 Process Instrumentation. *Oil and Gas Journal*, v. 52, Apr. 5, 1954, p. 82-101, 119.

Includes "Frequency-Response Analysis Holds Promise", John E. Barber; "Continuous Infrared Analysis of Liquid Streams", L. W. Herscher; "Some New Aspects of Cascade Control", C. W. Bowden, Jr. and Harry Hartz; "An Evaluation of Cascade Control Systems", J. G. Ziegler; and "Evaluation of New Instruments", W. A. Crawford. Diagrams, graphs, photographs, tables. 8 ref.

9785* Image Formation in the Electron Microscope. (German.) W. Glaser. *Optik*, v. 11, no. 3, 1954, p. 101-117.

Mechanism of electron microscopy. Diagrams, photographs.

9786 An Automatic Recording Potentiometer for Industrial Use. H. J. Roosdorp. *Philips Technical Review*, v. 15, Jan. 1954, p. 189-198.

Measures d.c. voltages, resistances, and impedances. Photographs, diagrams, table.

9787 Error and Accuracy in Thermocouple Psychrometry. J. L. Monteith. *Physical Society, Proceedings*, v. 67, no. 411B, Mar. 1, 1954, p. 217-226.

Main sources of error in determination of vapor pressure with thermocouple psychrometer. Tables, graphs. 12 ref.

9787a* Measure Surface Roughness. *Precision Metal Molding*, v. 12, Mar. 1954, p. 63-64.

Tool controlling and checking microfinish on metal parts. Table.

9788* An Instrument for Measurement of Very High Resistance. Frank J. Lynch and Clarence L. Wesenberg. *Review of Scientific Instruments*, v. 25, Mar. 1954, p. 251-255.

Range is 10^9 to 10^{13} ohms. Constant current flows through resistor under test; potential drop is measured with an electrometer. Photographs, diagrams.

9789* Interferometric Method Using Superposition Fringes. (French.) Michel Cagnet. *Revue d'Optique*, v. 33, no. 1, Jan. 1954, p. 1-25.

Theoretical and experimental study of properties and influence on sharpness and contrasts. Diagrams, graphs, photographs, tables. (To be continued.)

9790 Optical Pyrometers, Their Functioning and Maintenance. H. E. Trout, Jr. *Steel Processing*, v. 40, Apr. 1954, p. 237-241, 254.

Pyrometers designed, maintained, and checked for accuracy in the mill will give consistent, reliable results. Photographs, diagrams.

9791* Measuring Temperature With Fluorescent Materials. (German.) P. Brauer. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 9, Mar. 21, 1954, p. 285-287.

Coatings with different critical temperatures permit measurement. Graphs, photographs. 5 ref.

9792* Electronic Circuits of a Leak Detector. (French.) J. Lecomte, J. Taieb, and J. Thébault. *Vide*, v. 8, no. 48, Nov. 1953, p. 1422-1427.

Principal characteristics. Comparison of results with a.c. and d.c. amplifiers. Diagrams, photograph. 12 ref.

Books and Miscellaneous Publications

9793 Historical Metrology. A. E. Berriman. 224 p. 1954. E. P. Dutton & Co., N. Y. (QC83 B45h)

Development of money, weights, and measures in India, China, Russia, Egypt, Great Britain, and United States.

9794 Electron Optics. O. Klamperer. 2nd Ed. Cambridge Monographs on Physics. 471 p. 1953. Univ. Press, Cambridge, England. (QC447 K67e2)

Principles, methods, and applications. Lenses, emission systems, deflecting fields, and uses of electron microscopy in research and industry.

9795 B.I.M.C.A.M. Handbook. 133 p. 1953. British Industrial Measuring and Control Apparatus Manufacturers' Ass'n., London. (T12.G7 B77.5h)

Instrumentation as it serves atomic energy, chemical, coal, electrical, gas, oil, and water industries. Contains numerous photographs.

See also:

9405 (measuring of surface finish)
9594 (electrical contacts in instruments)
9624 (cost of instrumentation)
9891 (optical pyrometers)
9897 (furnace temperature regulator)
9914 (instruments in Al production)
10100 (scratch hardness tester)
10264 (measurement of air flow)
10453 (instruments for processing rubber)

LUBRICATION AND FRICTION

9796* General Properties of Synthetic Lubricants for Turbomachines. (French.) P. Hourlier. *Docaéro*, 1954, no. 26, Mar., p. 25-40.

Behavior and comparison of diesters; polyesters; silicic and phosphoric acid esters; silicones; and fluoro carbides. Graphs, diagrams, photographs, tables. 37 ref.

9797* Sleeve Bearing Application Factors. R. H. Josephson. *Electrical Manufacturing*, v. 53, Apr. 1954, p. 142-148.

Sleeve bearings now carry heavier loads at higher speeds and higher temperatures for longer periods of time. Defines demands put on bearings and how thin-wall insert bearing has met them. Diagram, graphs, tables, micrographs.

9798 Air-Lubricated Bearings. H. Drescher. *Engineers' Digest*, v. 15, Mar. 1954, p. 103-107. (From *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 95, no. 35, Dec. 11, 1953, p. 1182-1190.)

Previously abstracted from original. See item 5124, v. 3, Apr. 1954.

9799* Molybdenum Disulfide as a Lubricant. (German.) G. Spengler. *Erdöl und Kohle*, v. 7, no. 3, Mar. 1954, p. 156-160.

Source, extraction, and processing of natural molybdenite.

Lubrication and Friction

Chemico-physical and lubricating properties of MoS_2; shows importance of high purity. Diagrams, table. 19 ref.

9800* High Pressure Lubricants. (German.) Gerhard Cibula. *Erdöl und Kohle*, v. 7, no. 3, Mar. 1954, p. 181-182.
Improvement of adhesive properties and pressure-resistance of lubricants by means of additives.

9801* Experiments With Friction Bearing Metals. (German.) W. Peppler. *Forschung auf dem Gebiete des Ingenieurwesens*, v. 20, Ausgabe B, no. 1, 1954, p. 32-33.
Arrangement for testing and oscillographically recording bearing properties of lubricated metals. Diagrams, graph, oscillograms. 5 ref.

9802* Journal Bearing Calculations. (German.) H. Sassenfeld and A. Walther. *Forschung auf dem Gebiete des Ingenieurwesens*, v. 20, Ausgabe B, *VDI Forschungsheft*, no. 441, 1954, 28 p.
Physical problem boundary condition and mathematical treatment by Reynolds' equations. Graphs, tables, diagrams. 27 ref.

9803* How Engineers Select Metals for Oil-Film Bearing Applications. E. B. Etchells. *General Motors Engineering Journal*, v. 1, Mar.-Apr. 1954, p. 20-25.
Requirements a bearing metal must meet and properties of the available metals. Tables, diagrams, photographs. 8 ref.

9804 Roller-Bearings in Swedish Rolling Mills and the S.K.F. Rolling-Mill Design. Axel Leufvén. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 415-423 + 3 plates.
Importance of oil-injection method. Modern bearing applications in different types of rolling mill. Preloaded bearing housings and design for wire-rod and cold-rolling mills. Drawings, photographs, graph.

9805* Snythetic Oils for Aircraft Gas Turbine Lubrication. *Lubrication*, v. 40, Apr. 1954, p. 45-56.
Lubrication systems, and classes of synthetic oils. Diagrams, photographs, graphs, tables.

9806* Review of Synthetic Lubricants. D. H. Moreton. *Lubrication Engineering*, v. 10, Apr. 1954, p. 65-73.
Includes graph, tables. 48 ref.

9807 Design Factors for Jewel Bearing Systems. A. C. Lawson. *Machine Design*, v. 26, Apr. 1954, p. 132-137.
Different applications and design considerations. Photographs, diagrams, graphs. 3 ref.

9808* Survey of the Field of Wear. (German.) Hans Wahl. *Metalen*, v. 9, no. 4, Feb. 28, 1954, p. 49-58 + 2 plates.
Review of wear problems in bearing materials, tools, abrasives, tires, street surfaces, floor coverings, and clothing. Tables, graphs, photograph, diagrams.

9809* The Choice of Lubricants. Synthetic or Petroleum. W. Davey. *Petroleum*, v. 17, Apr. 1954, p. 122-126, 147.
Advantages, limitations, and methods of production. Diagrams, table, graphs. 25 ref.

9810 Powder Metal Bronze Bearings. A. J. Langhammer and Phillip Glick. *Product Engineering*, v. 25, Apr. 1954, p. 183-189.
Design data required to insure satisfactory service of self-lubricating bearings. Diagrams, graphs, photograph, table.

9811* New Method of Designating Lubricating Value. (French.) A. Maman. *Recherche Aéronautique*, 1954, no. 37, Jan.-Feb., p. 33-37.
Problem of determining unctuous behavior of lubricants. Apparatus and method for obtaining sliding friction characteristics. Diagrams, graphs, tables.

9812* Phosphorus in Additives for Lubricants. (French.) G. Avico and N. Tcherkezoff. *Revue de l'institut francais du petrole et Annales des combustibles liquides*, v. 9, no. 2, Feb. 1954, p. 51-66.
Classifies additives by method of preparation. Emphasis on detergents and extreme-pressure additives. 130 ref.

9813* Turbine Oils and Lubricating Oil Systems. IV. Cleaning Oil Turbine Systems. G. H. Clark. *Scientific Lubrication*, v. 6, Mar. 1954, p. 14-20.
Cleaning of old and new machines with various liquids and solvents. Types of strainers, magnetic filters, settling tanks, and centrifuges. Diagrams. (To be continued.)

9814* Lubrication of Gears. III. Spray Lubrication, Gear Oil as Hydraulic Medium. *Scientific Lubrication*, v. 6, Mar. 1954, p. 25-28, 30-31.
Gear box lubricating systems, automotive gear boxes, and automatic automobile transmissions. Photographs, diagrams. (To be continued.)

9815* Greases for Electric Motors. E. G. Jackson and E. R. Booser. *Spokesman*, v. 17, Mar. 1954, p. 8 + 6 pages.
Proposed specifications for hypothetical greases which should offer a four-fold life to past lubricants. Tables, photographs, graphs, micrographs. 5 ref.

9816* Substituted Ureas as Grease Thickeners. E. A. Swakon, C. G. Brannen, and L. C. Brunstrum. *Spokesman*, v. 18, Apr. 1954, p. 8-12.
Greases compounded with arylureas and silicone are non-corrosive, high melting, and thermally and chemically stable. Tables, photographs, graphs, micrograph. 15 ref.

9817* The Use of Anti-Friction Bearings in Ironworks From Maintenance Point of View. (German.) Hans Ponnath. *Stahl und Eisen*, v. 74, no. 7, Mar. 25, 1954, p. 396-402.
Types and selection of bearings. Damage features as key to cause of failure. Photographs, diagrams, table. 4 ref.

9818 Friction and Wear Investigation of Molybdenum Disulfide. II. Effects of Contaminants and Method of Application. Marshall B. Peterson and Robert L. Johnson. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3111, Mar. 1954, 19 p. (TL570 Un3t)
Used a low-speed kinetic-friction apparatus. Graphs, micrograph, photographs, table. 10 ref.

9819* The Stribeck Curve as Characteristic of General Friction Behavior of Lubricated Sliding Surfaces. (German.) G. Vogelpohl. *VDI Zietschrift des Vereines deutscher Ingenieure*, v. 96, no. 9, Mar. 21, 1954, p. 261-268.
Curve, based on laws of liquid friction, may be calculated with sufficient accuracy. Diagrams, graphs, photograph. 29 ref.

9820* Percolating of Lubrication Through a Bearing. (Russian.) A. K. D'iachkov. *Vestnik Mashinostroeniia*, v. 34, no. 2, Feb. 1954, p. 12-19.
Formulas consider rigidity of construction, position of lubricating orifice, form of loading, and size of longitudinal gap. Diagrams, graph. 5 ref.

Books and Miscellaneous Publications

9821 Selected Government Research Reports. v. XI. Lubricants and Lubrication. 234 p. 1952. Her Majesty's Stationery Office, London. (TJ1075 G79.7L)
Includes "Aeration of Engine Lubricating Oil: Development of Float-Operated Device for Preventing Aeration", C. A. Brown; "Greases for Use Over the Temperature Range −65°C to + 100°C", S. A. Pethrick and H. S. Wood; "Low Temperature Viscosities of Aero-Engine Cylinder Lubricating Oils Diluted With Aviation Gasoline", J. M. A. Court; "Methods of Estimating the Amount of Dilution in Lubricating Oil From Engines Using the Worth Dilution System", J. D. F. West; "The Selection of Greases for the Lubrication of Magnetos and Generators", S. R. Pethrick and H. S. Wood; "Investigation Into the Lubrication and Pivot Rust Prevention of Air Driven Gyroscopic Instruments", N. B. Owen; "A Method of Estimating the Lubricating Oil Content of Aviation Kerosene by Controlled Evaporation", P. Smith; "Physical Properties of Lubricating Oil D.E.D. 2472 B/O", R. Hilpert and R. Schmidt; "Behaviour of Aircraft Engine Oil Systems When Using Oil Dilution of Low Temperature Operation", N. Sharp; "The Measurement of Consistency of Soft Solids and Thickened Liquids", E. B. Clarke and E. W. J. Mardles; "The Use of the Moving Plate Viscometer for Studying the Flow Properties of Pastes and the Sedimentation and Caking of Particles in Sus-

pension", E. W. J. Mardles and E. B. Clarke; "Lubrication of Clockwork Mechanisms", F. Howick; "Anti-Spreading Dope; The Stability of Ferric/Cobaltous Stearate Solutions in Benzene and the Properties of Their Films in Inhibiting the Spreading of Oil", T. Kennaway; "Oils and Greases for the Treatment of Leather", M. C. Thompson; "Greases for Optical Instruments", D. M. Duckworth; "Grease, Wide Temperature Range", G. Kinner, D. S. Marshall, and D. M. Duckworth; "Boundary Friction Tests With Silicone Polymers" and "Boundary Friction Tests With Silicone Polymers. II. Greases", D. Clayton; and "An Investigation Into Methods of Measurement of Kinetic Boundary Friction", P. G. Forrester and A. A. Milne.

See also:
9485 (effects of electric current on roller bearings)
10068 (wear of metals and non-metals)
10095 (Cu penetration of railroad-car journals)

MECHANICAL ENGINEERING

9822 Non-Circular Cylindrical Gears. (English.) Uno Olsson. *Acta Polytechnica (Mechanical Engineering Series)*, v. 2, no. 10, 1953, 216 p. (T1 Ac81)

Method for designing, with any degree of accuracy, required non-circular cylindrical gears of any shape. Tables, graphs, diagrams, photographs. 77 ref.

9823* Contactor Servomechanisms Employing Sampled Data. C. K. Chow. *Applications and Industry*, 1954, no. 11, p. 51-62; disc., p. 62-64.

Sinusoidal response method of analysis and synthesis determines conditions for occurrence of self-sustained oscillations, amplitudes, and frequencies; evaluates critical values of certain system parameters. Tables, graphs, diagram. 19 ref.

9824* Analogy of Hydraulic, Mechanical, Acoustic and Electric Systems. J. C. Schönfeld. *Applied Scientific Research*, v. 3, sec. B, no. 6, 1954, p. 417-450.

Clearer conception of analogies pursued by treatment of hydraulic systems as distinct from mechanical systems; interpretation of acoustic as mixed mechanic-hydraulic systems; analysis of operation of piston mechanisms, and consideration of gyro-elements. Diagrams. 11 ref.

9825 Impact Vibration Damper and Its Use in Machines. L. B. Erlikh. *Henry Brutcher, Altadena, Calif., Translation no.* 3133, 14 p. (From *Stanki i Instrument*, v. 23, no. 7, 1952, p. 17-19.)

Reduction of vibration in machines by dissipating vibrational energy through impact of incompletely elastic bodies. Diagrams.

9826* Electro-Hydraulic Servo Systems. D. G. O'Brien and R. D. Atchley. *Electrical Manufacturing*, v. 53, Apr. 1954, p. 88-96.

Design of hydraulic portion of systems. Photograph, diagrams, graph, monogram.

9827 Evaluation of Performance for Appliance Controls. II. George C. Pearce. *Finish*, v. 11, May 1954, p. 52-53.

Techniques and devices for testing thermostat control components. Photographs.

9828 Predictor Servomechanisms. Lawrence M. Silva. *Institute of Radio Engineers, Transactions, Professional Group on Circuit Theory*, v. CT-1, Mar. 1954, p. 56-70. (TK1 In6.6t)

Optimizing transient behavior of a servo-mechanism in sense that transient response in minimum time is compared with minimum r.m.s. error criteria. Diagrams, graphs. 1 ref.

9829 The Bursting Speed of a Rotating Plastic Disc. H. J. Weiss and W. Prager. *Journal of the Aeronautical Sciences*, v. 21, Mar. 1954, p. 196-200.

Analysis of stresses and strains in a fully plastic, rotating, annular disc having initially uniform thickness, and made of strain-hardening material. Graphs. 11 ref.

9830 The Ultimate Strength of Aluminum-Alloy Formed Structural Shapes in Compression. Robert A. Needham. *Journal of the Aeronautcial Sciences*, v. 21, Apr. 1954, p. 217-229.

Method is based on assumption that a formed structural shape consisting of a series of flat plate elements can be treated as series of angle sections possessing various degrees of edge support parallel to direction of loading. Graphs, tables, diagrams. 18 ref.

9831* On Application of a Quasi-Static Variational Principle to a System With Damping. Morris Morduchow. *Journal of Applied Mechanics*, v. 21, Mar. 1954, p. 8-10.

Principal bending modes of vibration of a beam with a damping force proportional to velocity. 8 ref.

9832 Stress Analysis in Design. I. Fundamentals and Theoretical Methods. II. Limitations of Theoretical Methods. J. B. Hartman and R. E. Benner. *Machine Design*, v. 26, Mar. 1954, p. 134-147; Apr. 1954, p. 186-195.

Guide for efficient utilization of stress analysis procedures. Tables, graphs, photographs, diagrams. 26 ref.

9833 Optimum Design. R. T. Hinkle. *Machine Design*, v. 26, Mar. 1954, p. 165-174.

Concept for improving balance of design factors applied to dynamic loading of power chains, bolts, and mechanism components. Diagrams, graphs.

9834* Increase of Output and Economy in Machine Tools Through Stepless Drive. (German.) F. W. Simonis. *Metall*, v. 8, nos. 7-8, Apr. 1954, p. 266-275.

Theoretical and practical efficiency of various types of transmissions and possible application to machine tools. Graphs, tables, diagrams. 18 ref.

9835* Deep Well Pumps in Mining. I. E. I. McGee. *Mining Congress Journal*, v. 40, Mar. 1954, p. 27-31.

Equipment and performance characteristics. Photographs.

9836 Stress Concentration Problems in Hollow Drill Steel. W. H. McCormick and H. J. Benecki. *Mining Engineering*, v. 6, Mar. 1954, p. 282-283.

Potential problem areas and suggested solutions. Photographs.

9837* Critical Stress of a Long Cylindrical Shell During Torsion. (Russian.) N. A. Alumiae. *Prikladnaia Matematika i Mekhanika*, v. 18, no. 1, 1954, p. 27-34.

Integration of an equation of fourth order satisfying two boundary conditions on each contour of mean surface. Graph. 5 ref.

9838* Stability of a Spherical Shell Under Evenly Distributed External Pressure. (Russian.) V. I. Feodos'ev. *Prikladnaia Matematika i Mekhanika*, v. 18, no. 1, 1954, p. 35-42.

Galerkin method used. Graphs. 7 ref.

9839* Conditions for Existence of Stability Region for a One-Circuit System of Automatic Control. (Russian.) M. A. Aizerman and F. R. Gantmakher. *Prikladnaia Matematika i Mekhanika*, v. 18, no. 1, 1954, p. 103-122.

System of linear differential equations with constant coefficients. Tables. 3 ref.

9840* Theory of Stability of Motion. (Russian.) P. A. Kuz'min. *Prikladnaia Matematika i Mekhanika*, v. 18, no. 1, 1954, p. 125-127.

Two theorems for linear systems of disturbed motion equations. 3 ref.

9841 Effects of Size on Gear Design Calculations. Paul M. Dean, Jr. *Product Engineering*, v. 25, Apr. 1954, p. 129-140.

Influence of scale-effects on center distance, accuracy of angular transmission, and contact ratio in very fine pitch gearing. Methods of designing to minimize these factors. Tables, diagrams, graphs.

9842* Approximate Analysis of Structures in the Presence of Moderately Large Creep Deformations. N. J. Hoff. *Quarterly of Applied Mathematics*, v. 12, Apr. 1954, p. 49-55.

Limiting state of stress and strain, approached as creep strain become large as compared to elastic strain, is determined by simple non-linear stress-strain rate law. Graphs. 7 ref.

9843* First Elments in Calculating Aerodynamic Damping of Compressor-Blade Vibrations. (French.) Robert Le-

Mechanical Engineering

gendre. *Recherche Aéronautique,* 1954, no. 37, Jan.-Feb., p. 3-10.

Outlines how to evaluate damping of aerodynamic forces arising when blades of an axial compressor begin to vibrate. Diagrams. 6 ref.

9844* The Development of 4,000 lb./in.^{2} Hydraulic Systems. G. Orloff. *Royal Aeronautical Society, Journal,* v. 58, Mar. 1954, p. 185-194.

Design and operation for aircraft systems. Graphs, diagrams.

9845* Shearing Resistance of Bolts Partially Embedded in Concrete. D. R. Young and R. A. Hechtman. *Trend in Engineering, (University of Washington),* v. 6, Apr. 1954, p. 16-21.

Ultimate strength of concrete, bolt diameter, and length of embedment of bolt. Graphs, diagrams, photographs, tables.

9846 Dynamics of Mechanical Feedback-Type Hydraulic Servomotors Under Inertia Loads. Harold Gold, Edward W. Otto, and Victor L. Ransom. *U. S. National Advisory Committee for Aeronautics, Report* 1125, 1953, 21 p. (TL521 Un3r)

Power-amplifying, positioning device of type used in control-valve and gun-turret positioners, flight controls, and power-steering devices. Diagrams, oscillograms, photographs, graphs. 2 ref.

9847 Effects of Panel Flexibility on Natural Vibration Frequencies of Box Beams. Bernard Budiansky and Robert W. Fralich. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3070, Mar. 1954, 55 p. (TL570 Un3t)

Mechanism of coupling between panel and beam vibrations. Diagrams, graphs. 5 ref.

9848 The Effect of Dynamic Loading on the Strength of an Inelastic Column. William A. Brooks, Jr. and Thomas W. Wilder, III. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3077, Mar. 1954, 29 p. (TL570 Un3t)

Maximum loads of idealized inelastic H-section columns whose pinned ends approach each other at a constant rate. Graphs, diagrams, tables. 8 ref.

9849 An Analytical and Experimental Study of the Transient Response of a Pressure-Regulating Relief Valve in a Hydraulic Circuit. Harold Gold and Edward W. Otto. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3102, Mar. 1954, 54 p. (TL570 Un3t)

Measurements compared with responses calculated from differential equation of equivalent electric network. Tables, diagrams, graphs, photograph. 2 ref.

9850* Quality Determination of Cog Defects by Measuring Cog Deformation During Engaging Action and Under Operating Stress. (German.) G. Lehnert. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 96, no. 8, Mar. 11, 1954, p. 213-220.

Plotting deformation of a cog as function of its angular position yields deformation curves of cog stress. Method of evaluating production defects and determining quality of gear-drive mechanism. Photographs, diagrams, graphs.

9851 Practical Design for Welding. I. Rex Cleveland. *Welding Engineer,* v. 39, Apr. 1954, p. 50-53.

Materials; weld types and sizes; and strength requirements of members for tension, compression, and shear loadings. Diagrams.

9852* Mechanics of Tool Engineering. VII. Practical Application of Hydraulics. Andrew E. Rylander. *Western Machinery and Steel World,* v. 45, Mar. 1954, p. 75-80.

Application of machine tools calls for a basic knowledge of principles of hydraulics. Principles as applied in operation of pistons and other equipment on automatic machines. Diagrams.

9853 Discussion on Precision Spring Design. III. M. Gerard Fangemann. *Wire and Wire Products,* v. 29, Apr. 1954, p. 394-397.

Results of research work and design aspects of spiral springs and clamps. Graphs, table. 18 ref.

Books and Miscellaneous Publications

9854* ASME Handbook. Metals Engineering Design. Oscar J. Horger, editor, v. I, 405 p. 1953. McGraw-Hill. (TA459 Am35h)

Consists of 53 papers covering selections, mechanical properties, corrosion, metallurgical factors in design, and procedures.

9855 (Automatology. Principles of the Automatic Control of Machine Tools.) **Automatologie. Grundlagen der Stellsteuerung von Fertigungsmaschinen.** Wolfgang Schmid. 284 p. 1952. Carl Hanser Verlag, Munich. (TJ213 Sch52a)

Modern principles increase efficiency without sacrificing versatility. Covers mechanical, hydraulic, and electrically operated equipment.

9856 Engineering Mechanics. Ferdinand L. Singer. 2nd Ed. 525 p. 1954. Harper & Brothers, New York. (TA350 Si64e2)

In part I principles of statics; resultants of force systems; analysis of structures; friction; force systems in space; centroids and centers of gravity; and moments of inertia are covered. Principles of dynamics; rectilinear and curvilinear translation; rotation; plane motion; work and energy; impulse and momentum; mechanical vibrations; and graphic methods are included in part II.

See also:

9444 (corrosion problems in $(NH_4)_2SO_4$ manufacture)
9578 (electronic servo mechanisms)
10066 (deflections of square plates)
10104 (bending stresses in semi-monocoque shells)
10333 (statistics in design)
10518 (design of bridges)

METALLURGY

9857* Effective Use of Materials. F. Nixon. *Aircraft Production,* v. 16, Apr. 1954, p. 157-164.

Viewpoints, processes, and other factors influence economics of production. Photographs, chart, table.

9858 Tantalum and Columbium. Joseph W. Rose. *American Machinist,* v. 98, Apr. 12, 1954, p. 189-198.

Within limitations, these refractory metals can be formed, machined, and welded on conventional equipment. Photographs, table, diagrams.

9859 Zirconium. *American Machinist,* v. 98, Apr. 12, 1954, p. 199-202.

Summary of current shop practice and working problems encountered. Tables.

9860 Alpha-Molybdenum Hot-Work Die Steels. R. B. Corbett, J. A. Succop, and A. Feduska. *American Society for Metals, Transactions,* v. 46, 1954, p. 1599-1618; disc., p. 1618.

Properties of several steels investigated for possible application as hot-work die blocks, involved determinations of isothermal transformation characteristics and microstructures. Table, graphs, micrographs, diagram. 10 ref.

9861 Wire Nails. G. G. M. Carr-Harris. *Canadian National Research Council, Technical Information Service Report no.* 34, Jan. 1954, 14 p. (T13 N21.7t)

Characteristics and methods of manufacture. 44 ref.

9862* A-S10 G and A-S9 KG Preparation Standard. (French.) Jean Montupet. *Fonderie,* 1954, Feb., no. 97, p. 3820-3824.

French specifications for composition and properties of two Al casting alloys. Production methods. Table, micrographs.

9863 Current Light Alloy Specifications. *Light Metals,* v. 17, Apr. 1954, p. 119-127.

Index to British specifications. Tables.

9863a Some Properties and Applications of Indium. *Machinery (London),* v. 84, Apr. 9, 1954, p. 751-752.

Physical properties, principal applications, and future possibilities.

9863b Metallurgy in the Mechanical Spring Industry. III. Alloy Steel Wires. *Mainspring*, v. 15, Apr. 1954, 4 p.

Materials, processing techniques, and desirable characteristics. Photograph.

9864 Rhenium Metal. Its Properties and Future. L. W. Kates. *Materials & Methods*, v. 39, Mar. 1954, p. 88-91.

Ductile Re is investigated for electrical contacts, thermocouple alloys, and pen points. Photographs, tables. 2 ref.

9865 Materials for High Temperature Service. H. R. Clauser. *Materials & Methods*, v. 39, Apr. 1954, p. 117-132.

Superalloys, irons and steels, light metals, ceramics and cermets, plastics, and Cu or Cu alloys. Photographs, graphs, tables. 11 ref.

9865a Norway's Metal Industries. *Metal Age*, 1954, no. 26, Feb., p. 3-6.

Production of ferro-alloys, Al, Cu, Ni, and Zn. Map, table.

9866 Aluminum and Its Alloys in 1953. Some Aspects of Research and Technical Progress Reported. (English.) E. Elliott. *Metallurgia*, v. 49, no. 292, Feb. 1954, p. 82-90.

Extraction, founding, fabrication, constitution, and properties. 107 ref.

9867* Recent Progress in Tin Research. (French.) E. S. Hedges. *Metallurgia italiana*, v. 46, no. 1, Jan. 1954, p. 13-21.

Outlines work of Tin Research Inst. in field of Sn plating; electrodeposition of Sn and its alloys; corrosion; antifriction alloys; pewter ware; Cu-base alloys; and Sn-base organo-metallic compounds. Photographs, micrographs.

9868 A Physical Explanation of the Empirical Laws of Comminution. D. R. Walker and M. C. Shaw. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Mar. 1954, p. 313-320.

Comminution is basically the same process as metal grinding. 12 ref.

9869* Competition Between Aluminum and Steel. *Mining Journal*, v. 242, Mar. 26, 1954, p. 365-366.

Production and costs studied. Shows industries can use Al. Total consumption data indicate that competition between ferrous metals and Al will remain on a small scale. Table.

9870 Training Personnel. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 21-40.

Includes "How a Critical Shortage of Fuel Engineers for Open Hearth Operations Was Solved", William Whigham, Jr.; "Training Open Hearth Personnel in New Shops", H. L. Tear; "Training of Open Hearth Personnel, Republic Steel Corporation, Cleveland", R. P. Carpenter; "Training Open Hearth Personnel at Fairless Works", H. A. Parker; "Training Open Hearth Personnel at Ohio Works", E. L. Wentz; "Training Personnel at No. 2 and No. 4 Open Hearths, Bethlehem Steel Company", M. K. Morris; and "Training Open Hearth Personnel at Lukens Steel Company", C. H. Alexander.

9871 Rimmed vs. Capped Steel. R. D. Hindson. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 80-85.

Advantages and limitations of both grades for various applications. Photographs.

9872* Etchings and Nameplates. J. S. Mertle. *Photoengravers Bulletin*, v. 43, Mar. 1954, p. 5-36.

Developments and procedures for various metals, non-metals, plastics, and glass.

9873* Tellurium Alloy Lead Sheath for Power Cable. G. B. Shanklin and J. F. Eckel. *Power Apparatus and Systems*, 1954, no. 11, Apr., p. 294-300; disc., p. 300-304.

Tests on new alloy show more stabilized bending and creep properties than on existing cables. Allows wide latitude in heat treatment. Tables, graphs, photograph. 9 ref.

9874* Special Shapes in Aluminum Alloys Obtained by Extrusion and Their Application. III. (French.) Pierre Pétrequin and Michel Costeraste. *Revue de l'Aluminium*, v. 31, no. 207, Feb. 1954, p. 75-83.

Normal tolerances on angle radius, contour, angular opening, smoothness, surface coarseness, and finishing. Diagrams, tables, photographs.

9875 Non-Heat Treatable Titanium Goes to Work. Thomas A. Dickinson. *Steel*, v. 134, Apr. 5, 1954, p. 136-137, 140.

Methods for annealing, welding, inspection, forming and machining. Photographs, table.

9875a Tool and Die Materials Forum. *Steel*, v. 134, Apr. 19, 1954, p. 140-146, 148.

Cost-conscious users impose new requirements. Stresses chemical and physical properties once considered insignificant; notable gains being made in higher-alloy, high-physical property steels; and economy picture rounded out by new plastics for tools, dies, jigs, fixtures, gages, patterns, and locating blocks.

9876* Titanium. The Metal of 1954? II. Elmer H. Hahn, Jr. *Tooling and Production*, v. 19, Mar. 1954, p. 58-62, 65, 113.

Welding, grinding, machining, casting, forging, and scrap recovery. Photograph. 40 ref.

9877* Magnesium Alloys. (Russian.) Ia. E. Afanas'ev. *Vestnik Mashinostroeniia*, v. 34, no. 2, Feb. 1954, p. 39-42.

Chemical compositions and physical, mechanical, and technological properties. Tables. 5 ref.

9878 Applications of Alloy High-Strength Steels in Welded Structures. Howard L. Miller and Arthur E. Wilkoff. *Welding Journal*, v. 33, Apr. 1954, p. 339-350.

Steel having a minimum yield point of 70,000 psi was successfully used in design and fabrication of widely different types of equipment found in ordnance, transportation, and mining fields. Photographs, diagrams, tables.

9879 Evaluation of Superheater Materials for High-Temperature Steam. Bela Ronay and W. E. Clautice. *Welding Journal*, v. 33, Apr. 1954, p. 199S-206S.

Experimental installation evaluates superheater materials in contact with steam at temperatures between 1100 and 1500 F. Diagrams, tables, photographs, micrographs.

9880 The Economy of Shaped Wire. Emmett H. Mann. *Wire and Wire Products*, v. 29, Apr. 1954, p. 391-392, 454-456.

Economic advantages and production of shaped wires for use in many fabricating operations. Photographs, table.

Books and Miscellaneous Publications

9881 Heat-Resisting Steels and Alloys. C. G. Conway. 160 p. 1953. D. Van Nostrand Co., Inc. (TA473 C76b)

A concise data book giving high temperature properties of commercial steels and alloys.

9882 Soft Magnetic Materials for Telecommunications. C. E. Richards and A. C. Lynch, editors. 346 p. 1953. Pergamon Press Ltd., London. (TK3221 R39s)

Includes "Theoretical Remarks on the Influence of Slight Heterogeneous Impurities on the Initial Permeability of Nickel-Iron Alloys", M. Kersten; "Coercivities in Dilute Ferromagnetic Alloys", G. Bate, D. Schofield, and W. Sucksmith; "The Influence of Subdivision Into Elementary Domains on the High-Frequency Permeability of Ferromagnetic Conducting Bodies", L. Néel; "The Cardinal Magnitudes of Technical Magnetization", G. C. Richer; "Iron Losses Under Superimposed Alternating Inductions", J. Grieg and H. V. Shurmer; "Non-Linearity in Magnetic Core Materials at Low Field Strengths", K. E. Latimer; "Frequency-Dependence of Magnetization Processes in Ferrites and Its Relation to the Distortion Caused by Ferrite Cores", H. P. J. Wijn; "Hysteresis Intermodulation in Directional Filters", V. G. Welsby; "Physical Aspects of Losses in Soft Magnetic Materials", D. Polder; "Ferromagnetic Resonances, Hysteresis and Residual Losses in Ferrites and Metals", F. F. Roberts; "Relaxation Phenomena in Carbonyl Iron", T. A. Dunton; "Richter-Type After-Effect of the Permeability in Silicon-Iron Laminations", R. Feldtkeller; "Jordan-Type After-Effect (Residual Loss) in Powder-Cores", R. Feldtkeller; "The Thermal-Agitation After-Effect", J. C. Barbier; "A Study, With

Metallurgy

the Aid of Electropolishing, of the Behaviour of Soft Magnetic Materials Over a Wide Frequency Range", I. Epelboin; "On the Theory of Residual and Stratification Losses", A. Fairweather; "A Calorimetric Method of Finding the Total Loss in Ferromagnetic Specimens Subjected to an Alternating Magnetic Field", L. F. Bates, A. V. Davies, and D. J. Harper; "A Screening-Factor Technique for Permeability Determination and Some Experimental Results", F. F. Roberts; "Irreversible Magnetic-Viscosity Effects", R. Street and J. C. Woolley; "The Assessment of Inhomogeneity in Thin Strips of High-Permeability Alloys", A. C. Lynch; "Some Problems of Oscillographic Measurement of Characteristics of 'Rectangular-' Loop Magnetic Materials", G. R. Jackson, W. S. Melville, and D. W. R. Sewell; "X-Ray Diffraction Methods in the Appraisal of Nickel-Iron Powder-Cores", N. C. Tombs; "The Structure of Carbonyl Iron", A. Taylor; "Experimental Investigations on Nickel-Molybdenum-Iron Alloys With Extremely High Initial Permeability", F. Assmus; "The Properties and Potentialities of Cold Reduced Nickel-Iron", W. F. Randall and H. H. Scholefield; "Some Chemical and Physical Properties of Iron Powders and Their Effects on the Magnetic Properties", C. E. Richards; "50/50 Carbonyl Nickel-Iron Powders", C. E. Richards and D. C. Shotton; "Factors Influencing the Measured Value of Hysteresis Loss of Powder-Cores", P. R. Bardell; "Some Properties and Applications of Silicon-Iron", J. McFarlane and N. F. Mole; "A Laminated Flake-Iron Powder Material for Use at Audio and Ultrasonic Frequencies", G. Campbell and F. J. Wood; "The Pulse Characteristics of Ferrite Magnetic Materials", A. Langley Morris; "Some Pulse Tests on Magnetic Specimens Having Rectangular Hysteresis Loops", P. F. Dorey; "Magnetic Cores for Instrument Transductors", A. E. DeBarr and E. H. Frost-Smith; "Some A.C. Measurements on a Material Having a Rectangular Hysteresis Loop", S. E. Buckley, G. A. Jackson, and A. G. F. Thomas; and "The Magnetostriction of Ferrites", P. Popper.

9883 Radioactive Tracers in Physical Metallurgy Research. Michael B. Bever. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 278-311. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Fundamentals of suitable radioactivity and tracer techniques. Micrographs. 157 ref.

9884 Symposium on Tin. ASTM Special Technical Publication no. 141. 111 p. 1952. American Society for Testing Materials, Philadelphia. (TN793 Am35s)

Production; resources; coatings; properties; applications; and analysis.

9885 (Comprehensive Presentation of Iron Metallurgy) **Gemeinfassliche Darstellung des Eisenhüttenwesens.** 16th Ed. 581 p. 1953. Verlag Stahleisen, Düsseldorf, Germany. (TN705 V58g16)

History and general practice for ore and coal deposits; melting, shaping, and testing Fe and steel; production throughout the world; and importance of the German Fe industry.

See also:
9277 (chemistry of Zr)
9466 (Al in H.F. equipment)
9547a (use of TV in steel industry)

METALS—EXTRACTION AND REFINING

9886* High-Speed Steels, Their Origin, Development and Prospects. (English.) *Aciers Fins & Spéciaux Francais*, 1954, no. 16, Feb., p. 23-27.

History and production of different steel alloys in various countries. Photographs.

9887* Electrolysis of Molten Salts. (Italian.) Marc Van Lancker. *Alluminio*, v. 23, no. 1, Jan. 1954, p. 40-45.

Metallic equilibrium and enthalpy relations. Study of Al production. 22 ref.

9888 General Blast Furnace Session. *American Institute of Mining and Metallurgical Engineers, Proceedings*, v. 12, 1953, p. 104-157.

Includes "Further Studies of the Tuyere Zone of the Blast Furnace", J. B. Wagstaff; "Experimental Smelting of Char-Ore Agglomerates in a Low-Shaft Blast Furnace", Herbert Kay and Everett Gorin; "Use of Brazilian Ore in the Blast Furnace", James R. Lowe; and "Physically Hot Iron for the Open Hearth", D. M. Morrison.

9889 Blast Furnace Blowing-In Practice. *American Institute of Mining and Metallurgical Engineers, Proceedings*, v. 12, 1953, p. 216-245.

Includes "Preheating and Blowing-In Practice at the Blast Furnace", R. J. Wilson; "Method of Blowing-In Blast Furnace From Bank", Walter W. Durfee; "Blowing-In Practice at American Steel and Wire Division, Duluth Works", W. A. Abbett, Jr.; and "Blast Furnace Blowing-In and Drying-Out Practices, Bethlehem Plants", H. M. Kraner.

9890 Blast Furnace Operation. *American Institute of Mining and Metallurgical Engineers, Proceedings*, v. 12, 1953, p. 246-325.

Includes "Some British Aspects of High-Top-Pressure Operation", R. P. Towndrow and W. Banks; "Distribution of Materials in a Blast Furnace Model", R. L. Stephenson and F. C. Langenberg; "Optimum Composition of Blast Furnace Slag as Deduced From Liquidus Data for the Quaternary System CaO-MgO-Al_2O_3-SiO_2", E. F. Osborn, R. C. DeVries, K. H. Gee, and H. M. Kraner; and "Instrumentation for Blast Furnace Research", D. I. Sinizer, J. DePiccolellis, and E. R. Poor.

9891* New Processes of Measuring Temperature for the Iron Industry. II. Measuring Temperature With Radiation Pyrometers. (German.) Fritz Lieneweg. *Archiv für technisches Messen*, 1954, no. 218, Mar., p. 51-54.

Temperature measurement of bath, open-hearth furnace roof, and ingots. Color pyrometer for analysis of molten steel and predetermining its properties. Diagrams, graphs.

9892 The Use of Oxygen in the Iron and Steel Industry In Western Europe. I. Georg Bulle. *Blast Furnace and Steel Plant*, v. 42, Apr. 1954, p. 419-423, 427.

Blast-furnace practice, operation of open-hearth furnace, and steelmaking in electric furnaces.

9893 The Basic Open Hearth Process. II. Further Theoretical Considerations. G. Reginald Bashforth. *British Steelmaker*, v. 20, Apr. 1954, p. 134-138.

Physical chemistry and thermodynamics of steelmaking and deoxidation. Observations on avoidance of blowholes due to occluded gases. Choice of suitable deoxidizers to prevent nonmetallic inclusions in finished steel. 21 ref.

9894 Top Blowing of Basic Bessemer Iron With Pure Oxygen. F. A. Springorum, K. G. Speith, and W. Oelsen. *Henry Brutcher, Altadena, Calif., Translation no.* 3226, 25 p. (Condensed from *Stahl und Eisen*, v. 73, no. 1, 1953, p. 6-19.)

Production of steel equal to open-hearth steel with suitable additives, oxygen pressure, temperature, and slag composition. Diagrams, tables, graphs. 6 ref.

9895 Experiences With Ingot-Mold Washes. G. Kowarsch. *Henry Brutcher, Altadena, Calif., Translation no.* 3228, 11 p. (Condensed from *Stahl und Eisen*, v. 73, no. 25, 1953, p. 1654-1657.)

Requirements for minimized fuming; brief drying time, stability during storage, and constant consistency. Properties of "Calmit", "Randit", and "Helios".

9896 On the Production of Pure Metals of the Titanium Group by Thermal Decomposition of Their Iodides. V. Titanium. J. D. Fast. *Henry Brutcher, Altadena, Calif., Translation no.* 3243, 22 p. (From *Zeitschrift für Anorganische und Allgemeine Chemie*, v. 241, 1939, p. 42-56.)

Production of ductile Ti from TiI_4 and deposition on an electrically heated wire. Graph, diagram, tables, photographs. 12 ref.

9897* Temperature Regulator Used in Producing Germanium Crystals. G. J. Lehmann and C. A. Meuleau. *Electrical Communication*, v. 31, Mar. 1954, p. 19-26.

A H.F. furnace and an electronic temperature regulator that stabilizes at 930 ±0.16 C. Photographs, diagrams. 7 ref.

9898* High-Temperature Pressure Furnace. (German.) G. Busch, F. Hulliger, and U. Winkler. *Helvetica Physica Acta*, v. 27, no. 1, 1954, p. 74-80.

Design of furnace which can be rapidly heated to 5400 F and operated under vacuum or up to 10 atmospheres. Diagrams, graph. 4 ref.

9899 Separation of Tantalum and Niobium by Liquid-Liquid Extraction. J. R. Werning, K. B. Higbie, J. T. Grace, B. F. Speece, and H. L. Gilbert. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 644-652.

Batch and continuous contercurrent procedures compared and evaluated. Diagram, photographs, tables, graphs. 13 ref.

9900 Techniques for the Investigation of Thermal Conditions in Continuous Casting. D. M. Lewis. *Institute of Metals, Journal*, v. 82, Apr. 1954, p. 395-413 + 3 plates.

Apparatus and techniques for Al alloys. Photograph, radiograph, graphs, diagrams. 45 ref.

9901 Preparation of Ores. II. J. M. McLeod. *Iron & Steel*, v. 27, Mar. 1954, p. 103-109.

Sintering of low-grade iron ores. 55 ref.

9902 Electric Furnace Operation. F. S. Leigh. *Iron & Steel*, v. 27, Apr. 1954, p. 133-138.

Trends in modern design of switch gear and furnaces. Photographs. (To be continued.)

9903 Cost Comparisons of the Open Hearth and Electric Furnace. David D. Moore. *Iron and Steel Engineer*, v. 31, Mar. 1954, p. 55-65; disc., p. 65-69.

Elaborate and detailed studies on future of steelmaking. Tables, graphs.

9904 Modern Arc Furnace Equipment and Practices. E. H. Browning. *Iron and Steel Engineer*, v. 31, Mar. 1954, p. 70-74; disc., p. 75.

Reviews electrical equipment, costs, effect of higher secondary voltages, transformers, circuit breakers, and regulators. Graphs, photographs.

9905 The Future of Steel Melting. M. W. Thring. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 424-432.

Open-hearth furnace brought up to an overall thermal efficiency of 50% by various steps. Continuous-counter-flow steelmaking process would have a theoretical thermal efficiency of 70% on cold metal. Graphs, tables, diagrams. 4 ref.

9906 The Free Energy of Formation of Manganous Orthophosphate. J. Pearson, E. T. Turkdogan, and E. M. Fenn. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 441-444.

Reduction of manganous orthophosphate by H studied within 680 to 870 C. Results used to calculate standard free-energy change. Graphs, tables. 12 ref.

9907 Copper Smelting in Boliden's Rönnskär Works Described. Olov Herneryd, Olof A. Sundstrom, and Allan Norro. *Journal of Metals*, v. 6, Mar. 1954, p. 330-337.

Equipment, procedures, and economics in single shift operation. Tables, photographs, diagrams.

9908 Current Refractory Practice as Applied in Copper Smelting. William F. Rochow and Lincoln A. McGill. *Journal of Metals*, v. 6, Mar. 1954, p. 338-342.

Although refractories are available which permit reasonable or satisfactory smelting costs, extensive research continues in an effort to develop refractories which will be capable of withstanding even more severe treatment. Graph, diagrams. 2 ref.

9909 Direct Reading Spectograph Gives Accurate Control in Aluminum Production. Donald L. Colwell and Oldrich Tichy. *Journal of Metals*, v. 6, Mar. 1954, p. 343-345.

Advantages of spectrographic control in manufacture of Al from scrap. Photographs, tables.

9910 Rare Earth Additions Affect Surface Quality of Low Carbon Steel. J. V. Russell. *Journal of Metals*, v. 6, Apr. 1954, p. 438-442.

Reduces S content of steel; improves surface quality apparently by increase of Mn-S ratios. Graphs, photographs, table. 8 ref.

9911 Steelmaking Processes. Some Future Prospects. C. D. King. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Apr. 1954, p. 455-465.

Compares open-hearth, Bessemer, turbo-hearth, Linz-Donawitz, and electric-furnace processes. Tables, diagrams, charts, graphs.

9912 Chemical Reactions of Coke in the Iron Blast Furnace. James F. Peters. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Apr. 1954, p. 466-474.

Defines solution loss and shows it to have either a favorable or unfavorable effect on blast furnace performance. Theory explains earlier contradictions. Tables, graphs. 13 ref.

9913* Magnesium Extraction From Fused Salts. A. L. Hock. *Magnesium Review and Abstracts*, v. 9, Dec. 1953, p. 1-30.

Historical background; electrolysis in fluoride baths; electrolytes in molten chloride baths; principles of Mg electrolysis; cells based on natural and artificial carnallites and on Mg chloride cell feed; Mg cells with liquid cathodes; and possible trends in future design and operation of molten chloride cells. Daigrams, tables. 27 ref.

9914 Instrumentation. J. F. Hornor and J. V. Metzger. *Metal Industry*, v. 84, Mar. 12, 1954, p. 205-208.

Control instruments and their operation in a continuous casting process of the Properzi type producing Al rod. Photographs, diagrams.

9915* The Development of Modern Open-Hearth Furnace on the Principle of Maerz System. (German.) Friedrich Wilhelm Morawa. *Metallurgie und Giesserei Technik*, v. 4, no. 1, Jan. 1954, p. 3-12.

Data show lower costs. Diagrams, graphs. 12 ref.

9916* Operating Experiences With a Double Cowper. (German.) G. Naumann. *Metallurgie und Giesserei Technik*, v. 4, no. 1, Jan. 1954, p. 13-15.

Twin stoves eliminate combustion stack. Diagram. 3 ref.

9917* Copper Refining in Rotating Drums. (German.) *Metallurgie und Giesserei Technik*, v. 4, no. 1, Jan. 1954, p. 31-32.

Compared with ordinary reverberatory furnace. Diagrams, tables.

9918* Problem of Pig Iron Production in Low-Shaft Furnace. (German.) Kurt Säuberlich and Reinhold Baake. *Metallurgie und Giesserei Technik*, v. 4, no. 2, Feb. 1954, p. 55-60.

Low-grade iron ores smelted with low-grade cokes. Control of high S content. Tables, diagrams, graph.

9919* Present Status of Open-Hearth Operation in the German Democratic Republic. (German.) Karl-Friedrich Lüdemann. *Metallurgie und Giesserei Technik*, v. 4, no. 2, Feb. 1954, p. 85-90; disc., p. 90-94.

Output of 32 furnaces shows success of Maerz furnace design. Rapid melting techniques. Graphs. 8 ref.

9920 National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings, (Annual Volume), v. 36, 1953. 303 p. Amer. Inst. of Mining and Metallurgical Engineers, New York.

Includes 67 papers covering personnel training; operation of acid open hearths; operating metallurgy; refractories and masonry; fuels and combustion; and hot and cold metal basic practices.

9921 Quality Control in the Production of High-Sulphur Open Hearth Steels. J. H. Flaherty, Jr. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 13-19.

Elimination of Si in the block and other modifications of practice greatly improved quality of free-cutting steels. Graphs, table, micrographs.

9922 Training Open Hearth Personnel in New Shops. H. L. Tear. *National Open Hearth Committee of the Iron and*

Metals—Extraction and Refining

Steel Div. of the A.I.M.E., Proceedings, v. 36, 1953, p. 24-28; disc., p. 31-32.

Outlines program used at J & L's No. 4 shop. Table, graphs.

9923 Acid Operating. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 42-66.

Includes "Sand for Acid Open Hearths", Douglas C. Williams; and "Bottom Repair in Acid Open Hearth Furnaces", J. Benedict Kopec.

9924 Operating Metallurgy. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 67-109.

Includes "Comments on Quality Problems. Open Hearth vs. Electric Furnace", A. H. Osborne; "Quality of Alloy Steels. Open Hearth vs. Electric Furnace", B. R. Queneau; "Quality of Similar Grades of Carbon and Alloy Steels, Open Hearth vs. Electric Furnace", Walter Huhn; "Production and Quality of AISI C-1200 Series Screw Steels", S. Feigenbaum; "Production and Quality of AISI C-1200 Series Screw Steels", I. A. Sirel; "Rimmed vs. Capped Steel", R. D. Hindson; "Rimmed and Capped Steels", A. N. Swanson; "Factors Affecting Surface Quality of Aluminum-Killed Deep-Drawing Steel Sheets", R. J. Walter; "Factors Affecting Surface Quality of Aluminum-Killed Deep-Drawing Sheets", W. R. Huber and E. L. Robinson; "Open Hearth Bath Temperature Measurement", J. H. Richards; "Thermocouple Bath-Temperature Measurement, Bethlehem Steel", T. B. Winkler; and "Thermocouple Bath-Temperature Measurement, Steel Company of Canada", J. P. Orton.

9925 Factors Affecting Surface Quality of Aluminum-Killed Deep-Drawing Sheets. W. R. Huber and E. L. Robinson. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 90-95; disc., p. 95.

Cracking, scabs, deoxidation products, and their prevention. Photographs.

9926 Refractories and Masonry. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 111-167.

Includes "Effect of Restricted Uptake Design on Refractory Consumption and Production Rate", E. B. Speer; "Effect of Restricted Uptake Design on Production Rate and Refractories Consumption", M. J. Smith; "Economics of Port-End Construction", E. B. Speer; "Economics of Port-End Construction", A. J. Voss; "Economics of Open Hearth Port-End Construction", A. H. Sommer; "Economics of Open Hearth Furnace Port End Construction, Large Plants Versus Small Plants", W. J. Scharfenaker; "Hinged Slag-Pocket Doors", M. H. Weir; "Use of Special Explosives for Slag Removal", J. O. Dague; "Use of Special Explosives for Slag Removal", W. E. Brandt; "Steam Jet System for Removal of Flue Dust", John L. Peterson; "Monolithic Refractories in Furnace Spouts", V. W. Jones; "Monolithic Linings Successful at Crucible Steel Company", G. M. Burrier; "Monolithic Refractories in Furnace Spouts at Bethlehem Steel Company", J. C. MacNeill; "Checker Problems", R. S. Bowers; "Checker Problems at Inland Steel Company", George C. Lawton; and "Auxiliary Stack Checkers", Charles N. Straney.

9927 Monolithic Linings Successful at Crucible Steel Company. G. M. Burrier. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 151-153; disc., p. 155.

Practice and experience at Midland Works. Photographs, drawing.

9928 Fuels and Combustion. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 169-208.

Includes "Continuous Oxygen Analysis for Combustion Control in the Open Hearth", F. P. Hubbell; "Atomization of Liquid Fuels as Related to the Overall Operation of Open Hearth Furnaces", G. C. Primm; "Significance, Factors Involved, and Maintenance of Air Preheat", J. H. Kelley and G. E. Wenzel; "Manual Control of Firing Methods", H. W. Potter; "Scheduling Combustion Practice", J. R. Deppish; "Manual Control of Firing Rates at the Open Hearth by Roof-Temperature Measurements", L. N. McDonald; "Automatic Open Hearth Roof-Temperature Control", F. S. Swaney; "Automatic Roof-Temperature Control on Tilting Open Hearth Furnaces", Arthur W. Thornton; "Front-Wall Rayotube Installation Used at Geneva Works", E. Richards; and "Heating Up Open Hearth Furnaces After Rebuilds", Charles N. Jewart.

9929 Continuous Oxygen Analysis for Combustion Control in the Open Hearth. F. P. Hubbell. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 169-173; disc., p. 173-176.

Equipment and operating procedures. Diagram, table, photographs, graphs.

9930 Scheduling Combustion Practice. J. R. Deppish. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 188-192.

Need and advantages of controlled firing schedules. Table, chart.

9931 Automatic Open Hearth Roof-Temperature Control. F. S. Swaney. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 193-197; disc., p. 201.

Instrumentation and practice at J & L's Pittsburgh Works. Photographs.

9932 Automatic Roof-Temperature Control on Tilting Open Hearth Furnaces. Arthur W. Thornton. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 198-200; disc., p. 201.

Equipment and practice at U.S. Steel's National Works. Table.

9933 Hot Metal Basic Operations. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 209-244.

Includes "Open Hearth Furnace Design at Fairless Works", H. A. Parker; "Recent Trends in Furnace Design in New Plants", A. K. Moore; "New Bottoms and Refractories Used in Bottom Repair", J. F. Pollack; "New Bottoms and Refractories Used in Bottom Repairs", A. M. Kroner; "Significance Study of Open Hearth Variables", W. R. Weaver; "Effect of Sample Size on Validity of Conclusions in a Study of Graphite Versus Coal for Ladle Recarburization", W. A. Olsen; "Significance Studies at Wisconsin Steel Works", J. R. Brady; "Productivity by the Use of Oxygen as Complicated by Sulphur Limitations", J. E. Hood; "Productivity by Use of Oxygen Lance as Complicated by Sulphur Limitations", L. R. Berner; "Jet Tappers", R. W. Smith; and "Hydraulically Operated Ladle Stoppers", T. J. Hoby.

9934 Open Hearth Furnace Design at Fairless Works. H. A. Parker. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 209-215; disc., p. 217-219.

Design and arrangement of furnaces and auxiliary equipment. Photograph. diagrams.

9935 Recent Trends in Furnace Design in New Plants. A. K. Moore. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 215-217; disc., p. 217-219.

Shop and furnace improvements at Steel Co. of Canada's No. 3 shop.

9936 New Bottoms and Refractories Used in Bottom Repairs. A. M. Kroner. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 221-223; disc., p. 223.

Advantages of fully rammed bottoms. Practice and experience at Inland Steel.

9937 Productivity by Use of Oxygen Lance as Complicated by Sulphur Limitations. L. R. Berner. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings*, v. 36, 1953, p. 233; disc., p. 233-234.

Experience at Inland Steel's No. 2 plant. Table.

9938 Cold Metal and Basic Foundry Practice. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings,* v. 36, 1953, p. 245-278.

Includes "Comparison of the Electric and Open Hearth Furnaces on an Economic Basis", T. R. Scott; "Economics of Electric Furnace vs. Open Hearth With All Cold Metal Charge", J. E. Wilbanks; "Comparative Economics of Open Hearth and Electric Furnace Operation", C. L. King; "Factors in Producing Quality Steel", C. F. Henzelman; "Rammed and Castable Refractories for Open Hearth Service", R. R. Fayles; and "Recarburizing Heats With Coal or Coke Injected by Compressed Air", R. C. Buehl, R. J. Leary, and E. J. Ostrowski.

9939 Comparative Economics of Open Hearth and Electric Furnace Operation. C. L. King. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings,* v. 36, 1953, p. 250-251; disc., p. 251-252.

Good competitive position of electric furnace is indicated by experience at Kansas City Plant of Sheffield Steel.

9940 Effect of Reduced Aluminum Deoxidation on Cast Steel. A. W. Fastabend. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings,* v. 36, 1953, p. 253-260; disc., p. 260-261.

Practice resulted in lower tendency to hot-tearing. Graphs, tables, diagram. 5 ref.

9941 Factors in Producing Quality Steel. C. F. Henzelman. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings,* v. 36, 1953, p. 262-264; disc., p. 264-265.

Factors leading to desired quality, including pouring practice.

9942 Rammed and Castable Refractories for Open Hearth Service. R. R. Fayles. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings,* v. 36, 1953, p. 265-267; disc., p. 267-269.

History and recent developments point to increasing use.

9943 Recarburizing Heats With Coal or Coke Injected by Compressed Air. R. C. Buehl, R. J. Leary, and E. J. Ostrowski. *National Open Hearth Committee of the Iron and Steel Div. of the A.I.M.E., Proceedings,* v. 36, 1953, p. 269-275; disc., p. 275-278.

Tests made in laboratory furnace indicate practice is effective, rapid, and convenient. Table, diagram, photograph, graphs.

9944* The Effect of the Method of Casting on Distribution of Impurities in Aluminum and on the Appearance After Anodic Oxidation. (French.) H. Richaud. *Revue de métallurgie,* v. 51, no. 1, Jan. 1954, p. 13-16.

Causes and remedies of defects in rolled or forged products. Micrographs. 4 ref.

9945* A Method of Operation for Producing Basic Bessemer Steel Low in Nitrogen, Phosphorus, and Sulfur by Means of Oxygen Enriched Air. (French.) P. LeRoy, M. Gombert, and B. Trentini. *Revue de métallurgie,* v. 51, no. 1, Jan. 1954, p. 45-72.

Uses O enriched blast, oxidizing additions, a small static height of bath, temperature control, and a second slag. Tables, graphs. 10 ref.

9946* Contribution to Deoxidation Control in Steel. (German.) Walter Koch and Franz Wever. *Stahl und Eisen,* v. 74, no. 5, Feb. 25, 1954, p. 264-271 + 4 plates.

Oxide inclusions cannot be avoided but they may be influenced in steel works by simple measures. Graphs, micrographs, photographs, diagram. 6 ref.

9947* Experiences With Gas Generators With Steam Jackets for Open Hearth Furnaces. (German.) Heinz Wübbenhorst. *Stahl und Eisen,* v. 74, no. 5, Feb. 25, 1954, p. 272-279.

Experiments and results. Tables, diagrams, graphs. 8 ref.

9948* Contribution to Metallurgy of Refining Steel by Top-Blowing. (German.) Heinrich Rellermeyer and Theo Kootz. *Stahl und Eisen,* v. 74, no. 7, Mar. 25, 1954, p. 381-395.

Experimental blowing with air, O-enriched air, and pure O. Type and number of heats; blowability; and Mn slagging. Tables, graphs, diagrams. 45 ref.

9949 Desulphurization With Rare Earths. *Steel,* v. 134, Apr. 12, 1954, p. 110, 112, 117.

Some heats showed better than 90% desulfurization. Slowing reversion time is a real problem. Photograph, graphs, table.

9950* Interaction of Metallic Copper With Copper Mattes. (Russian.) N. P. Diev, V. V. Paduchev, and A. F. Plotnikova. *Zhurnal Prikladnoi Khimii,* v. 27, no. 2, Feb. 1954, p. 127-135.

Results, method of investigation, and dissolution mechanism at 1,000 and 1,200 C. Tables, graphs. 3 ref.

Books and Miscellaneous Publications

9951 Comparative Economics of Open-Hearth and Electric Furnaces for Production of Low-Carbon Steel. 77 p. 1953. Bituminous Coal Research, Inc., 2609 1st Nat'l. Bank Bldg., Pittsburgh. (TN677 B32c)

Reviews steelmaking practice. Compares present economics and future trends.

See also:

9184 (use of blast-furnace slag)
9196 (sand for acid open hearths)
9197 (bottom repair in acid open hearth furnaces)
9689 (liquid fuels in open hearth)
9761 (steel works instruments)
10297 (refining of U and Pu)
10338a (blast furnace operation)

METALS—FINISHING, POLISHING, AND CLEANING

9952 Uses of Ultrasonics in Degreasing Processes. Thomas J. Kearney. *Acoustical Society of America, Journal,* v. 26, Mar. 1954, p. 244-246.

"Detrex Soniclean" process combines sound energy and trichlorethylene solvent degreasing for metal cleaning. Photographs.

9953* Mechanical Surface Improvement (Grinding and Polishing) of Metals in England. (German.) W. Edwards. *Metalloberfläche,* Ausgabe B, v. 6, no. 3, Mar. 1954, p. 35-38.

Effect of design and preliminary treatment on quality of work. Nature of a polish, mechanical and electrical processes, working conditions, and use of holding devices. Diagrams. 5 ref.

9954 Cleaning and Preparation of Metals for Electroplating. VIII. Effect of Oxide Films. A Survey of the Literature. Henry B. Linford and Davis O. Feder. *Plating,* v. 41, Apr. 1954, p. 397-401.

Oxide films affect adhesion and microstructure of electroplate. Tables. 115 ref.

9955* Technical Problems in the Finishing Shop: Maintaining Efficiency in Trichlorethylene Degreasing Plants. E. E. Halls. *Product Finishing,* v. 7, Mar. 1954, p. 55-69, 118.

Development of process, equipment, techniques, and applications. Tables, graphs, photograph, diagram.

9956* Flat Polishing. Adam Zimmerman. *Products Finishing,* v. 18, Apr. 1954, p. 56 + 9 pages.

History, applications, construction of equipment, techniques of process. Diagram, graphs, table.

9957 Cleaning Metal With Sonic Waves. T. J. Kearney. *Steel,* v. 134, Apr. 5, 1954, p. 104-105.

Transducers generate ultrasonic energy for solvent. Difficult soils in hard-to-reach locations are readily removed. Photographs.

9958 The Applications of Blast Cleaning in Steel Processing. II. Blast Cleaning Machines. Victor F. Stine. *Steel Processing,* v. 40, Apr. 1954, p. 231-236, 253.

Numerous types of blast cleaning machines are classified in general groups according to type of work for which they have been designed. Photographs, tables.

Metals—Finishing, Polishing, and Cleaning

9959* Ultrasonics and Industrial Cleaning. William L. McCracken. *Tool Engineer*, v. 32, Apr. 1954, p. 66-68.

Digest of "Ultrasonic Techniques in Industrial Cleaning", to be presented at the 22nd ASTE Annual Meeting. Equipment, techniques and applications. Diagrams, photographs.

See also:
9217 (ultrasonic cleaning)

METALS—FOUNDRY PRACTICE

9960* Continuous Casting and Empirical Calculation of Descent Speed in Casting of Light Alloy Ingots. (Italian.) G. Porro and P. Lombardi. *Alluminio*, v. 23, no. 1, Jan. 1954, p. 23-34.

Determines optimum casting speed in relation to size of Al ingots. Diagrams, graphs, tables. 12 ref.

9961 Calcium Carbide Injection. A New Foundry Tool. H. E. Henderson and J. M. Crockett. *American Foundryman*, v. 25, Apr. 1954, p. 34-43.

Finely divided CaC_2 injected into molten Fe by means of dry N removes S, permits more economical alloy additions, and provides a base for conversion to spheroidal graphite. Diagrams, photographs, tables, graphs, micrographs. 3 ref.

9962 Heat Transfer Characteristics of Metals Cast in Shell Molds. R. E. Morey, H. F. Bishop, and W. S. Pellini. *American Foundryman*, v. 25, Apr. 1954, p. 46-50.

Solidification characteristics of metals cast into shell molds with backup are like sand castings. Without backup, differences dependent on specific conditions may develop. Photographs, graphs, tables. 3 ref.

9963 Gating and Risering of Magnesium Alloys. I-II. H. E. Elliott. *American Foundryman*, v. 25, Apr. 1954, p. 56-62; May 1954, p. 113-122. (AFS Convention Preprint no. 54-42.)

Rejects due to contraction in passing from liquid to solid state, their causes, and measures to correct them. Diagrams. 8 ref.

9964 Producing Titanium Alloy Castings. Marvin Glassenberg and Morris J. Berger. *American Foundryman*, v. 25, May 1954, p. 107-112. (AFS Convention Preprint no. 54-35.)

Furnace made for melting and casting Ti. Industrially-important castings were produced in zircon shell, dry silica sand, and graphite molds. Photographs, diagrams, tables. 3 ref.

9965 After Three Years: Developments in Shell Molding. E. I. Valyi. *American Foundryman*, v. 25, May 1954, p. 138-143. (AFS Convention Preprint no. 54-75.)

Contributions to art of shell molding. Includes coating of sand, shell forming, pattern heating, and curing. Photographs.

9966 The Residual Oxygen Content of Cupola-Melted Gray Cast Iron. E. A. Loria and H. W. Lownie, Jr. *American Society for Metals, Transactions*, v. 46, 1954, p. 409-417.

Critical survey of published data on vacuum-fusion analysis of cast iron. Explains high values reported in literature. Deoxidation theory for iron and steel. Table. 8 ref.

9967* Working of Zinc-Base Materials. Current-Supply Installations for Melting in Low-Frequency Induction Furnaces. (German.) E. Bartuska and K. Köller. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben*, v. 99, no. 3, Mar. 1954, p. 41-47.

Working by non-cutting methods. Design of furnace and current-supply arrangements for melting of Zn and its alloys. Photograph, diagrams. 6 ref.

9968* The Influence of Casting Temperature on Chill and Mottle Formation. W. J. Williams. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Feb. 1954, p. 136-144 + 4 plates.

Chill tendency decreases with casting temp. while melting temp. is above a minimum. Additions of Al accentuate effect of casting temp. Tables, photographs. 2 ref.

9969* A Cause of Cracking in Bath Castings. E. R. Evans and D. McK. Webster. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Feb. 1954, p. 145-159.

Cracking can be caused by abnormally high contents of Sb, B, and Pb in Fe. Tables, graphs.

9970 Horizontal-Axis Centrifugal Casting. A. J. Gibbs-Smith. *Canadian Metals*, v. 17, Apr. 1954, p. 28, 32.

Equipment and techniques for making cast iron pipe. Photographs, diagram.

9971* Influence of Copper on the Properties of Cast Irons. (French.) *Fonderie*, 1954, Feb., no. 97, p. 3825-3829.

Influence on Fe-C diagram; graphitization of gray pig; structure and mechanical properties; high-temperature and corrosion resistance; and on special cast irons containing Ni, Mn, Cr, or Mo. Table. 14 ref.

9972 Cast-Weld Construction. John Howe Hall. *Foundry*, v. 82, Mar. 1954, p. 114-119.

Cast-weld pieces often are better and cheaper than a one-piece casting or an assembly in which no cast parts are used. Photographs.

9973 Gating Factors. W. H. Johnson, H. F. Bishop, and W. S. Pellini. *Foundry*, v. 82, Apr. 1954, p. 102-107, 271-272.

Simple shop practices that the foundryman can use. Diagrams, graphs, photographs, radiographs. 9 ref.

9974 How to Modernize Your Foundry. Lester B. Knight. *Foundry*, v. 82, May 1954, p. 132-139.

Judicious spending to keep plants modern and to permit worker to produce the most for his efforts can increase quality, production, wages, and profits. Photographs, diagrams.

9975 Automation in the Foundry. William E. Dougherty. *Foundry*, v. 82, May 1954, p. 140-145.

Equipment, plant layout, and operating procedures. Diagram, photographs.

9975a Inventory of Foundry Equipment. *Foundry*, v. 82, May 1954, p. 146-163.

Molding and coremaking; sand preparation; melting and heat treating; materials handling; cleaning; and finishing. Tables.

9976 Dermatitis Prevention in the Foundry Industry. Floyd van Atta. *Foundry*, v. 82, May 1954, p. 289 + 5 pages.

Equipment and preventative techniques. Photographs.

9977 Estimation and Influence of the Gaseous Elements in Cast Iron. L. W. L. Smith and J. V. Dawson. *Foundry Trade Journal*, v. 96, Mar. 4, 1954, p. 233-238; Mar. 11, 1954, p. 275-280.

Formation of hot tears, inverse chill, variations in chilling tendency, and differences in annealability of malleable iron as affected by gas content. Tables, photographs, micrographs, graphs. 28 ref. (To be continued.)

9978 Cost Factors in Electric-Furnace Operation. F. S. Leigh. *Foundry Trade Journal*, v. 96, Mar. 18, 1954, p. 293-296.

Melting units critically analyzed with respect to capital and operating costs; method of use and metallurgical results. Tables.

9979 Estimation and Influence of the Gaseous Elements in Cast Iron. L. W. L. Smith, B. B. Bach, and J. V. Dawson. *Foundry Trade Journal*, v. 96, Mar. 18, 1954, p. 303-306; disc., p. 306-309.

Neutralizing effect of Al on carbide and stabilizing effect of N during second stage anneal was shown by heat treatment of specimens to which 0.1% Al was added prior to N treatment. Micrographs, graphs, table.

9980 Recent Developments With Synthetic Resins in the Foundry Industry. P. G. Pentz. *Foundry Trade Journal*, v. 96, Mar. 25, 1954, p. 323-328.

Choice of resins for sand binders. Graphs.

9981 Testing the Gas Content of Molten Metals. G. Ohira and V. Kondic. *Foundry Trade Journal*, v. 96, Mar. 25, 1954, p. 331-333.

Principle is of slowly solidifying small cylindrical casting, designed for good feeding during solidification. Density of cylinder is in direct relation to gas content of molten metal. Diagrams, graphs. 9 ref.

9981a Centrifugal Casting on the Continent. *Foundry Trade Journal*, v. 96, Apr. 1, 1954, p. 359-361.

Details of some current practices in production of cast iron pipe. Photographs, diagrams.

9982 Development of the Foundry Industry During the Past Fifty Years. V. C. Faulkner and S. H. Russell. *Foundry Trade Journal*, v. 96, Apr. 8, 1954, p. 399-418.

Reviews progress in all sections of foundry industry during the period under review. Diagrams, photographs.

9983 Balanced Production of Malleable. A. R. Parkes. *Foundry Trade Journal*, v. 96, Apr. 15, 1954, p. 437-447.

Equipment, plant layout, and operating procedures. Photographs, diagrams, tables.

9984* The Ladle Treatment of Cast Iron With Metallic Magnesium. (German.) A. Wittmoser. *Giesserei*, v. 41, no. 5, Mar. 4, 1954, p. 105-108.

Introduces Mg chips and granules in stream of N or air to make spheroidal graphite. Diagrams, table, micrographs. 20 ref.

9985* Reactions on Mold Surface. (German.) H. Reininger. *Giesserei*, v. 41, no. 5, Mar. 4, 1954, p. 109-111.

Effect of casting heat on synthetic molding sand. Gas permeability, and shear and compressive strength of synthetic compared with natural sand molds. Tables, micrographs, diagram, photograph. 11 ref.

9986* Investigations on Molding Sand. (German.) E. Wagner, H. Schlichtenmayer, H. Staud, and G. Weber. *Giesserei*, v. 41, no. 5, Mar. 4, 1954, p. 111-113.

Effect of vermiculite additions on gas permeability; compression and shear strength of synthetic sand containing bentonite; and of water content on properties. Tables, graphs.

9987* The Austenal Lost-Wax Process. (German.) H. J. Marshall. *Giesserei*, v. 41, no. 5, Mar. 4, 1954, p. 120-123.

Strength properties of various as-cast precision castings of Co alloy and different steels. Photographs, table.

9988* Operation and Operating Data on an 800-Kg Low-Frequency Induction Crucible Melting Furnace. (German.) H. Rohn. *Giesserei*, v. 41, no. 6, Mar. 18, 1954, p. 134-137.

Economy shown by actual melting operations. Diagram, photographs, tables.

9989* Flow Properties and Degree of Compressibility of Mold Materials. (German.) K. Wittmoser. *Giesserei*, v. 41, no. 6, Mar. 18, 1954, p. 140-141.

Pressure versus degree-of-compression curves require correction for each substance examined. Graphs, table. 3 ref.

9990* Heat-Conducting Pipe Eliminators. (German.) Béla Tisza. *Giesserei*, v. 41, no. 6, Mar. 18, 1954, p. 142-147.

Risers of molds for highly-shrinking metals can be considerably reduced by covering their surface with insulating or exothermic pipe eliminators. Diagrams, tables, photographs.

9991* Design of Molding Machines With Compressed-Air Drive. (German.) J. Broberg and L. Villner. *Giesserei*, v. 41, no. 7, Apr. 1, 1954, p. 153-160.

Suggested improvements for increased efficiency. Photographs, diagrams.

9991a* Centrifugal Machines for Casting Bearings for Railway Equipment of the German Federation. (German.) *Giesserei*, v. 41, no. 7, Apr. 1, 1954, p. 168-170.

Design and operation of Göttinger and Hall machines especially designed for lining bearings. Diagrams.

9992* Work Simplification in Foundries. (Swedish.) Lars Boman. *Gjuteriet*, v. 44, no. 3, Mar. 1954, p. 35-42.

Various methods of analysis. Detailed survey of stack molding unit. Diagrams, tables, photographs.

9993* Feeding and Solidification. III. Types of Feeding and Neck Core. (Swedish.) K. Akesson. *Gjuteriet*, v. 44, no. 3, Mar. 1954, p. 43-50.

Function and use of atmospheric feeders. Advantages and limitations compared with ordinary risers. Neck core materials, dimensions, and position in the mold. Diagrams, table, graphs. 13 ref.

9994 The Arc Melting of Metals and Its Application to the Casting of Molybdenum. G. L. Hopkin, J. E. Jones, A. R. Moss, and D. O. Pickman. *Institute of Metals, Journal*, v. 82, Apr. 1954, p. 361-373 + 2 plates.

Materials, equipment, and techniques. Micrographs, diagrams, photographs, graph, table. 7 ref.

9995 Shell Moulding in Action. M. J. Sargeaunt. *Machinery Lloyd (Overseas Ed.)*, v. 26, Mar. 13, 1954, p. 71, 73-80.

Effect of cleanliness and precision of the foundry on increasing productivity. Photographs, tables.

9996 Casting in Semi-Permanent Ceramic Moulds. *Machinery (London)*, v. 84, Mar. 19, 1954, p. 589-597.

For high-accuracy uncored castings of simple shape, without flanges or re-entrant angles which may hinder free contraction during cooling. Photographs.

9997 The Control of Production Variables in Die Casting. H. K. Barton and L. C. Barton. *Machinery (London)*, v. 84, Mar. 26, 1954, p. 658-666.

Metal analysis, injection temperature and pressure, die temperature, duration of casting cycle, condition of vents, mechanical efficiency of die, frequency of die and cavity lubrication, and cooling of castings. Diagrams, graphs.

9998 Shell Mould Casting of Motor Car Parts. James H. Smith. *Machinery (London)*, v. 84, Apr. 2, 1954, p. 687-694.

Machining costs pared by close tolerance casting. Casting procedure is discussed. Photographs.

9999* Gating Technique. A. De Jong. *Metalen*, v. 9, no. 6, Mar. 31, 1954, p. 85-89.

Advantages of knock-off risers in iron and steel casting, and for all types of sand casting not using Al in the alloy. Table, diagrams. 5 ref.

10000 Founding Magnesium-Base Alloys. XII. Coring. M. Caillon. *Metal Industry*, v. 84, Mar. 19, 1954, p. 232-234.

Factors to consider in core design and use. Principles for location and attachment of risers. Diagrams. (To be continued.)

10001 Faults in Pressure Die Castings. II. (English.) W. M. Halliday. *Metallurgia*, v. 49, no. 292, Feb. 1954, p. 55-60.

Surface and mechanical defects. Photographs.

10002* Sand-Contamination of Steel. Sand Spots and Scabbing in Steel Casting. (German.) Wolfgang Kilian. *Metallurgie und Giesserei Technik*, v. 4, no. 1, Jan. 1954, p. 34-36.

Difficulties related to grain size of the sand, temperature, and time. Graphs, micrograph. 8 ref.

See also:
9938 (basic foundry practice)
10279 (radiography of cast iron)
10325 (foundry research in England)

METALS—HEAT TREATMENT

10003 Some Metallurgical Variables Affecting Quench Cracking Susceptibility of Hollow Alloy Steel Cylinders. C. F. Sawyer and C. C. Busby. *American Society for Metals, Transactions*, v. 46, 1954, p. 100-112.

Effects of austenitizing temperature, normalizing prior to heat treatment, temperature to which quenched, cracking susceptibility of material at different positions in a forged ingot, and chemical composition of steel. Tables, graphs. 3 ref.

Metals—Heat Treatment

10004 Surface Hardening of Titanium by Carburizing and Induction Heat Treatment. A. J. Griest, P. E. Moorhead, P. D. Frost, and J. H. Jackson. *American Society for Metals, Transactions*, v. 46, 1954, p. 257-275; disc., p. 275-276.

Good wear resistance obtained in laboratory tests on specimens carburized in propane-argon gas mixtures. Thin cases (0.0002 in.) of TiC appeared to have best adherence and wear resistance. Graphs, micrographs, tables, photographs, diagram. 7 ref.

10005 Effect of Carbon and Boron on the Hardenability of a Case-Carburized Steel. R. A. Grange and J. B. Mitchell. *American Society for Metals, Transactions*, v. 46, 1954, p. 446-474; disc., p. 474-482.

Matched pair of 2% Mn steels, one with and one without B, were carburized. Hardenability was measured throughout case and in core by end-quench method. Tables, graphs, micrographs. 14 ref.

10006 Flame Hardening of Gray Iron Castings. Charles O. Burgess. *Foundry*, v. 82, Apr. 1954, p. 114-121 + 4 pages.

Improved physical properties may rest on fact that gray iron, like steel, exists in two atomic crystal (allotropic) forms, depending on its thermal treatment. Tables, graphs, photographs, diagrams, micrographs. 56 ref.

10007* Controlled Atmospheres for Heat Treatment of Metals: Methods and Equipment. Ernest S. Lanning, Jr. *Industrial Gas*, v. 32, Mar. 1954, p. 3-6, 19-24.

Atmospheres required for Cu, Ni, Al, Mg, precious metals, steel, and some of their alloys. Diagrams, graph, table.

10008 Simple Test Measures Quenching Power of Salt Baths. R. F. Harvey. *Iron Age*, v. 173, Apr. 8, 1954, p. 154-157.

Eccentric hardenability test specimen is basis of new method for determining effects of agitation on characteristics of hot salt baths. Photographs, graphs, diagrams. 7 ref.

10009* Proposed Calculating Values for Heat Resisting Steels Above 350 C. (Swedish.) Cyrill Schaub. *Jernkontorets Annaler*, v. 138, no. 2, 1954, p. 53-80.

Limits of analysis, heat treatment, and highest application temperatures for various steels. Graphs, tables. 29 ref.

10010* Strength Properties and Solution Annealing Time of Shapes From Hardenable Aluminum Alloys. (German.) W. Rosenkranz. *Metall*, v. 8, nos. 5-6, Mar. 1954, p. 177-179.

Time for achieving maximum strength is short. Graphs, tables.

10010a Heat Treatment in the Production of Magnets. *Metal Treating*, v. 5, Mar.-Apr. 1954, p. 8-9.

Proper heat treating produces high-Co "directionalized" Alnicos, most powerful magnets commercially known today. Photographs.

10011* Nitriding Tool Steel. (Russian.) A. N. Serov. *Stanki i Instrument*, v. 24, no. 9, Sept. 1953, p. 18-20.

Nitriding at 550 C for 25 to 30 hr. forms a layer deep enough for increased cutting speed. Graphs, tables.

10012* Optimum Steel Hardening Temperatures Using High Speed Electrical Heating. (Russian.) V. M. Zalkin. *Stanki i Instrument*, v. 25, no. 1, Jan. 1954, p. 16-17.

Tests made on structural and tool steels using line frequency current. Optimum temperature for all steels is 1000 C or slightly below. Graphs, table. 4 ref.

10013 Effect of Heat Treatment Upon the Microstructure and Hardness of a Wrought Cobalt-Base Alloy, Stellite 21 (AMS 5385). F. J. Clauss and J. W. Weeton. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3107, Mar. 1954, 26 p. (TL570 Un3t)

Alloy was solution-treated and transformed both by aging and isothermal transformation at 1200 to 1950 F from 5 minutes to 72 hours. Graphs, micrographs. 17 ref.

10014* Super Short Time High Temperature Heating in Heat Treatment of Hardened or Mechanically Work-Hardened Metals. (Russian.) O. L. Bendryshev. *Vestnik Mashinostroeniia*, v. 33, no. 10, Oct. 1953, p. 45-52.

Experiments determine possibility of eliminating mechanical cold hardening. Graphs, micrographs. 9 ref.

10015* Isothermal Hardening of High Speed Cutting Steel. (Russian.) Iu. A. Geller and S. D. Brik. *Vestnik Mashinostroeniia*, v. 33, no. 10, Oct. 1953, p. 52-56.

Recommend 200 to 300 C from 20 to 60 min. Graphs, micrograph. 4 ref.

10016* Use of Cyaniding in Mass Production. (Russian.) K. V. Kosov. *Vestnik Mashinostroeniia*, v. 34, no. 2, Feb. 1954, p. 62-65.

Temperature of bath, duration, concentration of cyanide, and size of batch. Diagrams, graphs, photograph.

10017* Decarburization of Steel in Direct Fired Furnaces. (Russian.) V. F. Kopytov, G. F. Kopytova, and P. V. Sorokin. *Vestnik Mashinostroeniia*, v. 34, no. 3, Mar. 1954, p. 36-40.

Tests of ball-bearing steel in atmosphere of city gas at various heating and soaking time cycles. Recommends faster heat treating processes for steel. Tables, graphs, diagrams, micrographs. 1 ref.

10018 Annealing and Patenting With Salt Baths. L. B. Rousseau. *Wire and Wire Products*, v. 29, Apr. 1954, p. 399-400.

Improvements in salt bath furnaces increase utility and variety of applications in wire industry. Photographs.

See also:
10169 (die-quenching of Al sheet)

METALS—MECHANICAL AND PHYSICAL PROPERTIES

10019 Internal Friction in Titanium and Titanium-Oxygen Alloys. (English.) J. N. Pratt, W. J. Bratina, and B. Chalmers. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 203-208.

Low-frequency torsional pendulum technique was used in study of α-Ti and Ti-O α-solid-solutions containing 4.5 at. % O. Graphs. 21 ref.

10020 Intergranular Cavitation in Stressed Metals. (English.) J. Neill Greenwood, D. R. Miller, and J. W. Suiter. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 250-258.

Cavities appear in intercrystalline boundaries transverse to tensile stress axis of Cu, α-brass, and Mg. Tables, graphs, micrographs. 15 ref.

10021 The Magnetic Susceptibility and Electronic Specific Heat of Transition Metals in Relation to Their Electronic Structure. (English.) E. C. Stoner. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 259-273.

Expressions are obtained by collective electron treatment for main relations in form suitable for application to experimental results. Graphs, tables. 37 ref.

10022 Creep of Silver Bromide at High Temperature. (English.) R. W. Christy. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 284-295.

Transient and steady-state creep rate of single crystal and polycrystalline specimens stressed in compression from 6 to 150 g./mm.^{2}, was investigated between 200 and 410 C, with emphasis on steady-state creep of single crystals. Graphs, photograph, table, diagrams. 23 ref.

10023 On the Calculation of the Strain Energy Associated With the Nucleation of a New Phase Within a Crystal. (German.) E. Kröner. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 302-309.

Permits calculation of strain energy, provided deformation is caused by difference in volume of phases and is not so large that approximations of linear theory of elasticity are invalid. Graph. 10 ref.

10024 A Statistical Study of the Stress-Rupture Test. C. W. Phillips and M. J. Sinnot. *American Society for Metals, Transactions*, v. 46, 1954, p. 63-86.

Replicate tests on 2S Al at 900 F. Variation in fracture time and reduction in area at given stress may be represented by logarithmic-normal distribution, while elongation distribution is normal. Graphs, tables, micrographs. 20 ref.

10025 A Study of Factors Controlling Strength in the Torsion Test. R. D. Olleman, E. T. Wessel, and F. C. Hull.

American Society for Metals, Transactions, v. 46, 1954, p. 87-99.

Tests over a wide range of tempered hardnesses in a 1.0% C, 5.0% Cr, 1.0% Mo, and 0.2% V tool steel. Diagram, table, graph, photographs, micrographs. 9 ref.

10026 Effect of Composition on Transverse Mechanical Properties of Steel. C. Wells, J. V. Russell, and S. W. Poole. *American Society for Metals, Transactions*, v. 46, 1954, p. 129-156.

Effects on tensile strength, reduction of area, and transverse impact strength of certain normalized, quenched, and tempered steels. Tables, graphs. 16 ref.

10027 Effect of Copper Additions on the Plastic Properties of an Aluminum-Zinc Alloy. C. D. Starr and J. E. Dorn. *American Society for Metals, Transactions*, v. 46, 1954, p. 348-353.

True stress–true strain curves exhibited increasing flow stresses with increasing atomic percentages of Cu. Tables, graphs. 9 ref.

10028 Flow and Fracture Characteristics of Annealed Tungsten. J. H. Bechtold and P. G. Shewmon. *American Society for Metals, Transactions*, v. 46, 1954, p. 397-408.

Except for temperature at which brittleness occurs, effect of temperature on tensile properties of W is similar to effect on other body-centered cubic metals. Diagrams, graphs, table, micrographs. 9 ref.

10029 Notch Ductility of Nodular Iron. W. S. Pellini, G. Sandoz, and H. F. Bishop. *American Society for Metals, Transactions*, v. 46, 1954, p. 418-445.

Impact and explosion tests of castings containing a sharp notch were used to evaluate significance of Charpy data to service and to establish comparisons with cast and rolled steels subjected to same tests. Photographs, table, diagrams, micrographs, graphs. 6 ref.

10030* The Magnetization in Iron-Silicon Crystals. (German.) Bruno Elschner. *Annalen der Physik*, v. 13, nos. 6-8, Dec. 15, 1953, p. 290-304.

Elementary magnetic zones in vicinity of grain boundaries; natural and artificially introduced impurities. Diagrams, micrographs. 17 ref.

10031* Electron Structure of Impurities in Metals. (French.) J. Friedel. *Annales de physique*, v. 9, 12me Serie, Mar.-Apr. 1954, p. 158-202.

Pattern of electrons around an impurity studied with respect to molecular energy levels, valence energy levels, and ion configurations. Graphs, diagrams, tables. 93 ref.

10032* Principles of Measuring Radiated Power. Wave Length Norms in the Visable Spectrum. (German.) H. Korte. *Archiv für technisches Messen*, 1954, no. 218, Mar., p. 57-60.

Wave lengths of a variety of metals under different atmospheric conditions. Tables. 7 ref.

10033 Mechanical Aspect of Seizing in Metal Wear. Harry Czyzewski. *ASME, Transactions*, v. 76, Apr. 1954, p. 381-385.

Accounts for accelerated mechanical abrasion. Mechanical analysis explains failure of externally lubricated alloys to equal performance of self-lubricated alloys. Micrographs, photographs, diagrams. 2 ref.

10034 Rapid Measurements of Thermal Diffusivity. G. E. McIntosh, D. C. Hamilton, and W. L. Sibbit. *ASME, Transactions*, v. 76, Apr. 1954, p. 407-409; disc., p. 409-410.

Apparatus and technique for determining thermal diffusivity of metals by a periodic heat-flow method. Graph, diagrams. 14 ref.

10035* Designing Boiler Parts for Temperatures Exceeding 500 C. (German.) W. Dörrscheidt. *Brennstoff-Wärme-Kraft*, v. 6, no. 3, Mar. 1954, p. 90-92.

Strength properties and admissible stresses of different steels at various temperatures. Graphs. 8 ref.

10036 Contribution to the Theory of the Coercive Force of Steel. E. Kondorskii. *Henry Brutcher, Altadena, Calif., Translation no*, 3221, 8 p. (From *Doklady Akademii Nauk SSSR*, v. 63, no. 5, 1948, p. 507-510.)

Energy of magnetic fields originating in inclusions. Author's theory of critical fields and coercive force as influenced by magnetic effects of inclusions. 6 ref.

10037 On the Theory of the Coercive Force of Low Carbon Steels. E. Kondorskii. *Henry Brutcher, Altadena, Calif., Translation no.* 3239, 6 p. (From *Doklady Akademii Nauk SSSR*, v. 68, no. 1, 1949, p. 37-40.)

Theoretical analysis of conditions under which domain boundaries can pass through relatively coarse inclusions in mild steels. Diagrams. 6 ref.

10038* Most Recent Developments in Rope Testing at the Ontario Research Foundation. O. W. Ellis, M. A. Slaats, K. J. Frampton, and H. A. Ellis. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 503, Mar. 1954, p. 170-182; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 57, 1954, p. 102-114.

Equipment and techniques for wire and cable testing. Tables, photograph, graphs, diagrams.

10039* New Method of Studying Wear by Means of Radioactive Tracers. (French.) Bernard Jaoul. *Comptes rendus*, v. 238, no. 6, Feb. 8, 1954, p. 648-649.

Studies wear of dies during hot extruding of steels by applying a photographic film of appropriate sensitivity on surface-activated die. Graph, diagram.

10040* Thermoelectric Properties of Bismuth. (French.) Jean Savornin and André Poggi. *Comptes rendus*, v. 238, no. 6, Feb. 8, 1954, p. 656-657.

Systematic measurements were made of thermoelectric power of Bi associated with Cu. Graphs.

10041* Influence of Very Low Impurity Content on Electric Conductivity of Refined Aluminum at Very Low Temperatures. (French.) Michel Caron, Philippe Albert, and Georges Chaudron. *Comptes rendus*, v. 238, no. 6, Feb. 8, 1954, p. 686-688.

Measurements on specimens of 99.95 to 99.998% purity from 2.2 to 80 K show stronger effect on samples with highest purity. Graphs, table.

10042* Different Forms of the Principle of B. de Saint-Venant. (French.) Walter Schumann. *Comptes rendus*, v. 238, no. 9, Mar. 1, 1954, p. 988-990.

A theoretical study of deformation of a prism. 7 ref.

10043* Applications of the Method of Superimposed Lattices to the Study of Various Problems of Elasticity. (French.) Lucien Malavard and Jean Boscher. *Comptes rendus*, v. 238, no. 10, Mar. 8, 1954, p. 1093-1095.

Applies to states of elasticity of planes or surfaces of revolution, and to flexure of elastic plates.

10044* The Variation of Magnetic Permeability of Irons and Steels as a Function of Mechanical Stresses. (French.) Jean Creusot. *Comptes rendus*, v. 238, no. 11, Mar. 15, 1954, p. 1203-1204.

Variation in magnetic induction of specimens subjected to constant magnetic field. 5 ref.

10045* Paramagnetism and Distribution of Electrons in Definite Compounds $NiAl_3$, $CoAl_3$, $FeAl_3$, $MnAl_6$, and $CrAl_7$. (French.) Gabriel Foëx and Jules Wucher. *Comptes rendus*, v. 238, no. 12, Mar. 22, 1954, p. 1281-1283.

Results of magnetic measurement to determnie negative valence. Tables.

10046* Magnetic and Dilatometric Study of $CeMg_2$ Formation. (French.) Francoise Gaume-Mahn and Micheline Cohen. *Comptes rendus*, v. 238, no. 12, Mar. 22, 1954, p. 1302-1303.

$CeMg_2$ prepared by prolonged heating of mixture of CeMg and $CeMg_3$ below 600 C. Existence of $CeMg_2$ indicated by sharp changes in magnetic and expansion coefficients. Graph. 4 ref.

Metals—Mechanical and Physical Properties

10047* Analysis of the Magnetization of Finite Ferromagnetic Cylinders in Constant Fields by the Method of the Theories of Dimensions and of Similarity. (Russian.) V. G. Vitol and I. M. Kirko. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 807-808.

Experimental data on cylinders of Armco iron, tool steel, and steels A-12 and U-10. Graphs. 9 ref.

10048* Influence of Oxide Films on the Mechanical Properties of Monocrystals of Cadmium. (Russian.) V. I. Likhtman and V. S. Ostrovskii. *Doklady Akademii Nauk SSSR*, v. 93, no. 1, Nov. 1, 1953, p. 105-107.

Mechanism by which thin oxide films increase creep limits and retard further deformatoin. Preparation of film and test specimen. Graphs, table. 4 ref.

10049* Influence of Additions of Alkaline Metals on the Surface Tension and Microhardness of Bismuth. (Russian.) I. P. Altynov. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 845-846.

Shows increased microhardness with greater surface activity of the addition. Graphs. 9 ref.

10050* Hardness of Solids. D. Tabor. *Endeavour*, v. 13, Jan. 1954, p. 27-32.

Indentation hardness of metal is roughly related to its plastic yield-stress. Extension of work provides a very simple physical explanation to familiar Mohs scratch-hardness scale for minerals. Graphs, tables, photographs. 14 ref.

10051* High-Temperature Steam Pipes. P. H. Margen. *Engineering*, v. 177, Apr. 9, 1954, p. 457-462.

Properties of main high-temperature pipe steels. Suggested working stresses applied to problems of design. Tables, graphs. 17 ref.

10052* The Ductilometer Test. A New Method of Establishing the Ductility of Metals. E. Jonnerby. *Ericsson Review*, 1953, no. 4, p. 119-127.

Design and operation of instrument to determine ductility of wire, sheet, or strip. Tables, graphs, photographs, diagrams.

10053* The Eddy-Current Anomaly in Sheet-Metal Cores. (German.) Günther Sorger. *Frequenz*, v. 8, no. 3, Mar. 1954, p. 83-91.

Effects of eddy current on complex permeability were computed. Frequent deviations from computed values are caused by inhomogeneity of local permeability and by zonal structure of ferromagnetism. Diagrams, graphs, table. 12 ref.

10054 Heat Transfer to Aluminum. I. Kirtland Marsh. *Industrial Heating*, v. 21, Apr. 1954, p. 658 + 6 pages.

Information for furnace manufacturers in design and construction of furnaces for heating Al. Equally valuable to fabricators of Al by giving a better understanding of operating characteristics of furnaces when heating various types and classes of products. Photograph, graph, table. 4 ref. (To be continued.)

10055 The Forgeability, Creep Strength, and Ductility of Molybdenum and Some of Its Alloys. J. H. Rendall, S. T. M. Johnstone, and W. E. Carrington. *Institute of Metals, Journal*, v. 82, Apr. 1954, p. 345-360 + 2 plates.

A short review of previous work; experimental techniques; effects of alloying elements on forgeability and creep strength; and effect of processing variables and alloying additions on ductility. Photograph, tables, micrographs, diagrams, graphs. 27 ref.

10056 Factors Influencing Brittleness in Aluminum-Magnesium-Silicon Alloys. I. R. Harris and P. C. Varley. *Institute of Metals, Journal*, v. 82, Apr. 1954, p. 379-393 + 2 plates.

Effect of composition, heat treatment, cold work, and structure on brittleness and mechanical properties of wrought Al-Mg-Si alloys containing 0 to 2% Si and 0 to 2% Mg. Micrographs, photographs, tables, diagrams, graphs. 25 ref.

10057 Endurance Limit of Zirconium Spreads Over Wide Range. W. P. Wallace and R. H. Wallace. *Iron Age*, v. 173, Mar. 18, 1954, p. 146-147.

Testing of specimens of crystal bar Zr under repeated stress at room temperature. Zr does not have a clearly defined endurance limit. Graphs, micrographs, tables.

10058 Test Determines Presence of High Residual Stresses in Stainless. Hyman Kirtchik. *Iron Age*, v. 173, Apr. 1, 1954, p. 130-133.

Tests type 410 stainless steel for stresses high enough to cause cracks in subsequent service. Table, graph.

10059* Practical Aspects of Hardness Tests for Strip Steel. (Swedish.) G. Molinder. *Jernkontorets Annaler*, v. 138, no. 2, 1954, p. 81-96.

Compares Vicker's method with Rockwell C on cross sections. Tables, graphs, diagram. 5 ref.

10060* Analysis of Plastic Deformation in a Steel Cylinder Striking a Rigid Target. E. H. Lee and S. J. Tupper. *Journal of Applied Mechanics*, v. 21, Mar. 1954, p. 63-70.

G. I. Taylor dynamic compression test consists of firing a cylinder of material to be tested at a target of hardened armor plate, and deducing dynamic yield stress from resulting deformation. Theoretical determination of entire strain distribution in such a test cylinder of Ni-Cr steel. Diagrams, photographs, graphs. 9 ref.

10061 Heat Transfer Measurements at Sodium-Stainless Steel Interface. James W. Moyer and William A. Riemen. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 400-402.

Measures heat-transfer coefficient at a Na-type-347 stainless steel interface. Diagrams.

10062 A Quantitative Measure of Temper Embrittlement. Norman Brown. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Mar. 1954, p. 361-365.

Theories of flow and fracture show difference in reciprocals of transition temperatures is a quantitative measure of temper embrittlement. Experimental data support this conclusion. Tables, graphs. 18 ref.

10063 On the Effect of Oxygen on Molybdenum. R. E. Maringer and A. D. Schwope. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Mar. 1954, p. 365-366.

Embrittlement effect was studied by internal friction measurements. Graph, photograph, table, micrograph. 2 ref.

10064 Load-Temperature History of Lattice Strain in Aluminum Alloy. D. Rosenthal and M. Kaufman. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Mar. 1954, p. 377-380.

Results indicate neither X-ray nor lattice strains constitute suitable parameter for finding equation of state. Photographs, graphs. 4 ref.

10065 Hartree-Fock-Slater Self-Consistent Field and the Calculation of Some Properties of the Cu^+ Ion. J. C. Morrow. *Journal of Physical Chemistry*, v. 58, Mar. 1954, p. 245-247.

Calculates diamagnetic susceptibility, polarizability, and refractivity, Lamb diamagnetic shielding at the nucleus, and structure factors for X-ray and fast electron scattering. Tables.

10066* Deflections of Laterally Loaded Square Plates Under Various Edge Conditions. Toshio Nishihara and Kichinosuke Tanaka. *Memoirs of the Faculty of Engineering, Kyoto University*, v. 15, no. 4, Oct. 1953, p. 197-212.

Derives a fundamental solution for any boundary condition in a plate clamped or supported at its edges. Coefficients are included for various boundary conditions. Tables. 2 ref.

10067* Review of the Field of Wear and Tear. II-III. (German.) Hans Wahl. *Metalen*, v. 9, no. 5, Mar. 15, 1954, p. 68-74; no. 6, Mar. 31, p. 91-98.

General and specialized basic research; investigation on wear of metals by minerals; and development and testing of various wear-resistant materials. Tables, charts, diagrams, photographs. (To be continued.)

10068* Combating Wear and Tear. (Dutch.) H. Blok and G. Salomon. *Metalen*, v. 9; *Handel en Industrie*, v. 9, no. 4, Feb. 28, 1954, p. 26-30.

Maintenance problems in metallic and non-metallic material wear. Diagram. 7 ref.

10069* Aluminum-Zinc Alloys. Mechanical Properties of Aluminum-Zinc Alloys With 22 to 70% Aluminum and Influence of Various Additions. (German.) E. Pelzel. *Metall*, v. 8, nos. 3-4, Feb. 1954, p. 83-88.

Effects of Mg, Pb, Fe, Si, and up to 5% Cu additions. Tables, graphs, micrographs. 14 ref.

10070* Local Tendency of Change of Solution Pressure of Metals Under Slight Stresses. (German.) Paul Koch. *Metalloberfläche*, Ausgabe A, v. 8, no. 3, Mar. 1954, p. 37-41.

Metallographic, magnetic, and ultrasonic investigation of elastic and plastic deformations on thin micro-tensile specimens. Change in potential with stress applied in one of two steel springs immersed in an electrolyte. Diagrams, graphs, micrographs. (To be continued.)

10071 Plane Plasticity. B. B. Hundy. *Metallurgia*, v. 49, no. 293, Mar. 1954, p. 109-118.

Fundamentals of theory of plasticity as basis for understanding more useful parts of theory. Diagrams, photographs, graphs, table. 43 ref.

10072* Contribution to the Study of the Modulus of Elasticity of Metallic Alloys. (French.) René Le Roux. *Métaux, Corrosion-Industries*, v. 29, no. 342, Feb. 1954, p. 66-87.

Modulus of elasticity of Cu alloys; relation to chemical composition. Micrographs, tables, graphs. 15 ref.

10073 Theory of Displacement of Domain Boundaries. N. S. Akulov and G. S. Krinchik. *National Science Foundation Translation*, no. 106, Nov. 1953, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 89, 1953, p. 809-812.)

Displacement in ferromagnet under simultaneous action of external magnetic field and opposing fields. 7 ref.

10074 The Path of the Deformation Process as a Basic Characteristic of the Deformed State of a Plastic Body. S. I. Gubkin and Ye. S. Bogdanov. *National Science Foundation Translation, no.* 125, Nov. 1953, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 88, 1953, p. 967-970.)

Intensity is only deformation variable proportional to expended work and to change in physical state. 3 ref.

10075 Wear Resistance of Carbon Steel Subjected to Rubbing in Certain Liquid Media After Diffusion Chromizing. M. M. Khrushchov, M. A. Babichev, and G. N. Dubinin. *National Science Foundation Translation, no.* 196, Feb. 1954, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 92, no. 2, Sept. 11, 1953, p. 303-306.)

Previously abstracted from original. See item 5342, v. 3, Apr. 1954.

10076 Some Physical Properties of Metallic Plutonium. W. B. H. Lord. *Nature*, v. 173, Mar. 20, 1954, p. 534-535.

Includes transition temperatures, phase densities, coefficients of linear thermal expansion, and electrical resistance. Tables.

10077 Magneto-Resistance of Copper to 150,000 Oersted at 4.2° K. J. L. Olsen and L. Rinderer. *Nature*, v. 173, Apr. 10, 1954, p. 682.

Extends measurements at liquid-He temperatures to field-strengths of approximately 150,000 oersted. Graph. 5 ref.

10078* Investigation on the Strength of 24 S-T Alclad Riveted and Bolted Lap Joints at Rapidly Applied Loads. J. P. Benthem and R. Kruithof. *Netherlands National Luchtvaartlaboratorium Report* S. 415, July 1953, 5 p. + 12 plates. (Tl526.N3 N38.5r)

Load was applied to specimens from 0.01 to 1.5 sec. Load vs. time diagrams. Diagrams, graphs, photograph, 5 ref.

10079 Thermodynamic Properties of Liquid Sodium. John F. Lee. *Nucleonics*, v. 12, Apr. 1954, p. 74, 76-77.

Tabulates data at 5 F intervals from 208 to 1500 F; shows derivation. 5 ref.

10080* The Damping of Elastic Waves in Lead at High Temperature. (Italian.) P. G. Bordoni and M. Nuovo. *Nuovo cimento*, v. 11, ser. 9, no. 2, Feb. 1, 1954, p. 127-141.

Damping of longitudinal vibrations in range from 10 to 40 kc., for temperatures between 300 and 600 K. Graphs, diagrams, table. 20 ref.

10081 Furnace Spectrum of Plutonium. John G. Conway. *Optical Society of America, Journal*, v. 44, Apr. 1954, p. 276-278.

Spectrum from a modified King furnace was observed between 3476 and 6888 A. at temperatures of 2000 to 2600 C. Table, diagram, spectrogram. 3 ref.

10082* C.E.M.E. Conference, December 18, 1953. Present Results of the Statistical Study of the Mechanical Characteristics of Steels A37 and A42. III. Exploitation of Results for Application to Metallic Construction. (French.) M. Hebrant. *Ossature metallique*, v. 19, no. 3, Mar. 1954, p. 135-141.

Choice of lower limit of elasticity as a criterion for calculating admissible stresses; determination of admissible stresses from results of statistical study; importance of controlling elastic limit and its consequences. Tables, graphs.

10083* Some Ordering Effects in Cu_3Au at About 100°C. R. A. Dugdale and A. Green. *Philosophical Magazine*, v. 45, 7th ser., no. 361, Feb. 1954, p. 163-172.

Using electrical resistance as an indicator for ordering, it was found that Cu_3Au specimens show an ordering effect at about 100 C. Tables, graphs, diagrams. 9 ref.

10084 Thermodynamical Theory of Galvanomagnetic and Thermomagnetic Phenomena. I. Reciprocal Relations in Anisotropic Metals. (English.) R. Fieschi, S. R. De Groot, and P. Mazur. *Physica*, v. 20, no. 2, Feb. 1954, p. 67-76.

Relations are derived for heat and electric conduction, and cross-effects in presence of a magnetic field. 11 ref.

10085 The Magnetic Susceptibility of Nd Metal. J. F. Elliott, S. Legvold, and F. H. Spedding. *Physical Review*, v. 94, ser. 2, Apr. 1, 1954, p. 50-51.

Susceptibility of Nd over tempearture range of 20.4 to 300 K. Low-field susceptibility at 20.4 K is larger than predicted by low-temperature Curie-Weiss law, and has a definite field dependence. Graph, table. 9 ref.

10086 Effect of Elastic Strain on the Electrical Resistance of Metals. G. C. Kuczynski. *Physical Review*, v. 94, ser. 2, Apr. 1, 1954, p. 61-64.

Coefficients of electrical resistivity of 18 metals and alloys determined experimentally. For most metals, free electron theory accounts qualitatively for observed effects. Tables, graphs. 21 ref.

10087 Justification of the Use of Perturbation Theory in Metallic Conductivity. J. S. van Wieringen. *Physical Society, Proceedings*, v. 67, no. 411A, Mar. 1954, p. 206-216.

Correction terms for scattering by two centers are shown to be negligible for Fermi gas. Diagrams. 10 ref.

10088 Nuclear Magnetic Resonance in Metallic Lithium and Sodium. H. Jones and B. Schiff. *Physical Society, Proceedings*, v. 67, no. 411A, Mar. 1954, p. 217-220.

Observed 'Knight-shifts' agree with results of cellular-type calculations of electronic states in metallic Li and Na. Tables. 12 ref.

10089 The Thermal Conductivity of Metals. R. E. B. Makinson. *Physical Society, Proceedings*, v. 67, no. 411A, Mar. 1954, p. 290-291.

Investigates Sondheimer's equations on conductivity of a monovalent metal. 2 ref.

Metals—Mechanical and Physical Properties

10090 The Work Function of Irregular Metal Surfaces. T. J. Lewis. *Physical Society, Proceedings,* v. 67, no. 411B, Mar. 1, 1954, p. 187-200.

Image potential of an electron outside an irregular metal surface differs from that for an ideal plane surface. Importance in theory of electron emission from metals. Graphs. 15 ref.

10091 The Effect of Compressive and Shearing Forces on the Surface Films Present in Metallic Contacts. M. Cocks. *Physical Society, Proceedings,* v. 67, no. 411B, Mar. 1, 1954, p. 238-248.

Two electrical methods show extent to which oxide or other natural surface films can prevent intermetallic contact when metal bodies are pressed together. Graphs, diagram. 16 ref.

10092 Mohs's Hardness Scale—A Physical Interpretation. D. Tabor. *Physical Society, Proceedings,* v. 67, no. 411B, Mar. 1, 1954, p. 249-257.

Suggests relation between Mohs hardness and indentation hardness of minerals. Graphs, diagram. 14 ref.

10093 The Elastic Constants and Density of Palladium Silver Alloys. F. E. Hoare and B. Yates. *Physical Society, Proceedings,* v. 67, no. 411B, Mar. 1, 1954, p. 266-267.

Investigation of Young's modulus, rigidity, and density for a series of Pd-Ag alloys, and the pure metals. Graphs. 6 ref.

10094* Mechanical Properties of Aluminum Electrical Bus. G. W. Stickley and C. O. Smith. *Power Apparatus and Systems,* 1954, no. 11, Apr., p. 100-106.

Data that will assist designer. Results of tensile, compressive, and bend tests. Graphs, tables, photographs. 12 ref.

10095* Copper Penetration of Car Journals. *Railway Locomotives and Cars,* v. 128, Apr. 1954, p. 58-61.

Cu penetration between grain boundaries produces failure in journal bearings. Micrographs, table.

10096* An Apparatus for the Determination of the Solidus Temperatures of High-Melting Alloys. R. A. Oriani and T. S. Jones. *Review of Scientific Instruments,* v. 25, Mar. 1954, p. 248-250.

Apparatus determines melting temp. of alloys to 2200 ± 10 C and avoids contamination from container. Table, diagram, photograph. 3 ref.

10097* Characteristic Features and Determination of the Concept of Vickers Microhardness. (French.) H. Bückle. *Revue de métallurgie,* v. 51, no. 1, Jan. 1954, p. 1-12.

Study of causes of error in microhardness testing shows possibility of distinguishing three ranges of Vickers hardness. Table, micrographs, graphs, diagrams. 35 ref.

10098 The Surface Temperature of Sliding Solids. F. P. Bowden and P. H. Thomas. *Royal Society, Proceedings,* v. 223, ser. A, Apr. 7, 1954, p. 29-40 + 1 plate.

Temperature developed at points of rubbing contact between a metal and a transparent solid is determined by measuring infra-red radiation transmitted through the solid. It is shown that high, fluctuating temperatures occur. Results are in general agreement with those obtained by other physical methods. Graphs, diagram, oscillograms. 10 ref.

10099* The Relationship Between Hardness and Tensile Tests. (German.) A. Braun. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 2, Feb. 1954, p. 56-58.

Elasticity, hardness increase, and heterogeneity factors responsible for load dependence in hardness testing. Graphs, table. 2 ref.

10100 Scratch Hardness Measurement With a Diamond Pyramid. T. Land and B. Sugarman. *Sheet Metal Industries,* v. 31, no. 322, Feb. 1954, p. 140-142, 158.

Evolution of an accurate instrument. Graphs, photographs. 2 ref.

10101 Possible Sources of Error in Hardness Testing. K. Meyer. *Sheet Metal Industries,* v. 31, no. 324, Apr. 1954, p. 289-293; disc., p. 293-299, 341. (Translated from German by P. Grodzinski.)

Some sources of error are scratches, cracks, broken out pieces, and matt surface spots. Effects on Brinell and Vickers testers. Micrograph, graph, charts. 5 ref.

10102* Influence of Chemical Composition and Quenching Temperature on Increase of Tensile Strength of Water Hardened Spring Wire From Unkilled Basic Converter Steel. (German.) Robert Grimm and Alfred Krüger. *Stahl und Eisen,* v. 74, no. 6, Mar. 11, 1954, p. 331-338.

Includes tables, graphs, micrographs. 14 ref.

10103 Results of Edge-Compression Tests on Stiffened Flat-Sheet Panels of Alclad and Nonclad 14S-T6, 24S-T3, and 75S-T6 Aluminum Alloys. Marshall Holt. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3023, Apr. 1954, 18 p. (TL570 Un3t)

Investigates compressive strength in range where ultimate strengths approach compressive yield strengths of materials. Graphs, photographs, tables, diagrams. 3 ref.

10104 Experimental Stress Analysis of Stiffened Cylinders With Cutouts. Pure Bending. Floyd R. Schlechte and Richard Rosecrans. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3073, Mar. 1954, 41 p. (TL570 Un3t)

Bending tests on a cylindrical semi-monocoque shell of circular cross section. Graphs, photograph, diagrams, tables. 4 ref.

10105 Experimental Investigation of the Pure-Bending Strength of 75S-T6 Aluminum-Alloy Multiweb Beams With Formed-Channel Webs. Richard A. Pride and Melvin S. Anderson. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3082, Mar. 1954, 30 p. (TL570 Un3t)

Results for 53 multiweb beams of various proportions. Graphs, tables, photograph. 5 ref.

10106 A Further Investigation of the Effect of Surface Finish on Fatigue Properties at Elevated Temperatures. Robert L. Ferguson. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3142, Mar. 1954, 27 p. (TL570 Un3t)

Effects of surface roughness on fatigue properties of low-carbon N-155 alloy with grain size ASTM 6 and S-816 alloy with a grain size of ASTM 6 to 7, at 80, 1200, 1350, and 1500 F. Graphs, micrographs, photographs, tables. 10 ref.

10107 Coefficient of Friction and Damage to Contact Area During the Early Stages of Fretting. II. Steel, Iron, Iron Oxide, and Glass Combinations. John M. Bailey and Douglas Godfrey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3144, Apr. 1954, 26 p. (TL570 Un3t)

Experiments on the start and cause of damage, at frequency of 5 cycles per min., amplitude of 0.006 in., and load of 150 g. in air with relative humidity of less than 10%. Graphs, diagram, tables, micrograph.

10108 Relation of Microstructure to High-Temperature Properties of a Wrought Cobalt-Base Alloy, Stellite 21 (AMS 5385). F. J. Clauss and J. W. Weeton. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3108, Mar. 1954, 49 p. (TL570 Un3t)

Microstructure of wrought Stellite 21 responds readily to solution treatment and to isothermal and aging heat treatments to form pearlitic and Widmanstätten structures as well as scattered precipitate. Graphs, micrographs, diagram, table. 7 ref.

10109 Fatigue Investigation of Full-Scale Transport-Airplane Wings. Summary of Constant-Amplitude Tests Through 1953. M. J. McGuigan, Jr., D. F. Bryan, and R. E. Whaley. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3190, Mar. 1954, 45 p. (TL570 Un3t)

Constant-amplitude tests conducted by resonant-frequency method at four different alternating load levels about a level-flight mean load. Photographs, diagrams, tables, graphs. 12 ref.

10110* Shrinkage, Shrinkage Stresses, and Their Effect in Metallic Constructions. (German.) H. Sossenheimer. *VDI*

Zeitschrift des Vereines deutscher Ingenieure, v. 96, no. 9, Mar. 21, 1954, p. 275-278.

Possibilities of shrinkage control through plastic straining during welding.

10111* Effect of Hardening by Heating With High-Frequency Currents on Strength of Cast Iron Parts. (Russian.) Ia. E. Gol'dshtein. *Vestnik Mashinostroeniia*, v. 34, no. 2, Feb. 1954, p. 55-62.

Experimental investigation. Tables, graphs, micrographs, photograph. 10 ref.

10112* High-Frequency Heat Treatment of Ferrite-Pearlitic Malleable Iron. (Russian.) P. I. Rusin. *Vestnik Mashinostroeniia*, v. 34, no. 2, Feb. 1954, p. 66-67.

Hardness and microhardness are tabulated. Hardness increases with pearlite content and C-pockets. Micgraphs, tables.

10113* The Concentration of Stress and Calculation of the Strength of a Shaft Having Transverse Openings. (Russian.) A. S. Leikin. *Vestnik Mashinostroeniia*, v. 34, no. 3, Mar. 1954, p. 3-14.

Stress distribution in bending and torsion tests of hollow Al shafts. Significance of size and slope of holes. Diagrams, graphs, table. 12 ref.

10114* Calculation of Disks With Consideration of Plastic Deformation. (Russian.) R. M. Shneiderovich. *Vestnik Mashinostroeniia*, v. 34, no. 3, Mar. 1954, p. 14-20.

Integral equations of plasticity for problem of supporting capacity, stress, and deformation of varied-contour steel disks. Graphs. 4 ref.

10115* Molybdenum-Less Steel for Cold-Forging and Tool Dies. (Russian.) D. I. Kostenko. *Vestnik Mashinostroeniia*, v. 34, no. 3, Mar. 1954, p. 40-45.

Compares hardness, heat resistance, and deformation of Mo and Ti steels. Results indicate Mo can be replaçed with Ti in cold stamping and threading dies. Tables, graphs.

10116* Second Phase Mechanisms During Testing of Austenite Steel Relaxation. (Russian.) Ia. S. Gintsburg. *Vestnik Mashinostroeniia*, v. 34, no. 3, Mar. 1954, p. 46-49.

Construction of relaxation curves in semi-logarithmic coordinates and their extrapolation for long-term testing has great possibilities in evaluating relaxation. Tables, graphs. 2 ref.

10117* Strength of Weld Joints of Low-Alloy and Low-Carbon Steels. (Russian.) M. M. Kraichik and A. I. Krasovskii. *Vestnik Mashinostroeniia*, v. 34, no. 3, Mar. 1954, p. 63-64.

Compares impact, aging, creep, fatigue, and tensile strengths of welding steels. Table, graphs. 3 ref.

10118 Fatigue Tests of Spot Welds in Cor-Ten and Mild Steel. Georges Welter and André Choquet. *Welding Journal*, v. 33, Mar. 1954, p. 135S-140S.

Fatigue tests and distribution of stresses in multiple Cor-Ten and mild steel spot-welded sheets with and without hydrostatic treatment. Tables, diagrams, graphs. 9 ref.

10119 Evaluation of Notch-Bend Specimens. P. P. Puzak and W. S. Pellini. *Welding Journal*, v. 33, Apr. 1954, p. 187S-192S.

Energy transition curve provides significant and practical method of correlation to service performance of welded structures based on use of Charpy V-notch specimens. Diagrams, graphs, table. 6 ref.

10120 Critical Energy Rate Analysis of Fracture Strength. G. R. Irwin and J. A. Kies. *Welding Journal*, v. 33, Apr. 1954, p. 193S-198S.

Mechanical concepts basic to an understanding of fracturing control possibilities and their applicability to large welded structures. Diagram, graph. 8 ref.

10121* The Magnetic Susceptibility of Chromium. (German.) Friedrich Wagenknecht. *Zeitschrift für anorganische und allgemeine Chemie*, v. 275, nos. 1-3, Feb. 1954, p. 59-64.

Preparation, analysis, and magnetic measurement of electrolytic Cr. Tables, graph. 16 ref.

10122* Antiferromagnetic States of Precipitates in the Cu-Fe System. (German.) A. Knappwost. *Zeitschrift für Elektrochemie*, v. 58, no. 1, 1954, p. 65-66.

Magnetic measurements show relation to γ state of the Fe. 7 ref.

10123* Properties of Metallic Melts. IX. Internal Friction of Liquid Aluminum-Zinc Alloys. (German.) Erich Gebhardt, Manfred Becker, and Stefan Dorner. *Zeitschrift für Metallkunde*, v. 45, no. 2, Feb. 1954, p. 83-85.

Viscosity decreased continuously with increasing temp. Table, graphs. 13 ref.

10124* Paramagnetism During Precipitation in the System Copper-Iron. (German.) Adolf Knappwost. *Zeitschrift für Metallkunde*, v. 45, no. 3, Mar. 1954, p. 137-142.

Magnetic moments of Fe ions in Cu lattice. Diagram, graphs, tables.

10125* Expansion of Spin-Wave Theory of Ferromagnetism to Higher Temperatures. (German.) G. Heber. *Zeitschrift für Naturforschung*, v. 9a, no. 2, Feb. 1954, p. 91-97.

Elimination of several approximation assumptions results in improvements in statistical evaluation of energy spectrum and better temp. dependence. Graphs. 5 ref.

10126* The Temperature Dependence of Residual Resistance in Tungsten in Temperature Range of 14 to 373 K. (German.) Erich Krautz and Hermann Schultz. *Zeitschrift für Natuforschung*, v. 9a, no. 2, Feb. 1954, p. 125-129.

Investigates deviations from Matthiessen's rule. Temperature-dependence on cold-deformed wires agrees with Kohler's theory. Graph, tables. 11 ref.

10127* Exprimental Proof of the Semiconducting Character of Compounds CdTe and In_2Te_3. (German.) J. Appel. *Zeitschrift für Naturforschung*, v. 9a, no. 3, Mar. 1954, p. 265-267.

Preparation of specimens and measurement of electrical conductivity of specimens from room temperature to 900 and 1100 K. Shows that saturation of outer atomic shells of each element imparts a distinct semiconducting character. Diagram, graphs. 4 ref.

10128* Magnetization of Extremely Thin Iron Films. (German.) W. Reincke. *Zeitschrift für Physik*, v. 137, no. 2, 1954, p. 169-174.

Vapor-deposited films were suspended on a silk fiber in magnetic field. Magnetic susceptibility computed from the duration of oscillations, moment of inertia of the glass plate, and vol. of deposited Fe. Diagram, graphs. 15 ref.

10129* Ferromagnetism and Band Structure of the Transition Metals. (German.) F. Bader, K. Ganzhorn, and U. Dehlinger. *Zeitschrift für Physik*, v. 137, no. 2, 1954, p. 190-199.

Method explains that mathematics fails to show quantum-theoretically assumed abnormal change of the signs of the *d*-functions of ferromagnetic states. Diagrams, graphs, tables. 36 ref.

10130* Magnetic Susceptibilities of Ternary Magnesium Alloys and Their Importance From the Standpoint of the Electron Theory of Metals. (German.) H. Klee and H. Witte. *Zeitschrift für physikalische Chemie*, v. 202, nos. 5-6, Jan. 1954, p. 352-378.

Brillouin's zone model explains susceptibility of electron gases. Results indicate a paramagnetic effect corresponding to anomalous diamagnetism. Tables, graphs, diagrams. 27 ref.

10131* Measurement of Small Vapor Pressures at High Temperatures. IV. Partial Vapor Pressues of Components in the System Silver-Lead. V. Partial Vapor Pressures of Components in the System Iron-Phosphorus. (Russian.) A. A. Granovskaia and A. P. Lieubimov. *Zhurnal Fizicheskoi Khimii*, v. 27, no. 10, Oct. 1953, p. 1437-1445.

Evaporation from an open surface and utilization of radioactive isotopes. Tables, graphs, diagram. 3 ref.

Metals—Mechanical and Physical Properties

Books and Miscellaneous Publications

10132 Conference on Brittle Fracture in Steel. p. 145-406. 1953. West of Scotland Iron and Steel Institute, Glasgow. (TA465 C76)

Includes "Brittle Fracture Studies in the United States", S. L. Hoyt; "The Brittle Fracture Problem From a Shipbuilder's Point of View", N. G. Leide; "The Mechanism of Fracture in Impact Tests", P. Matton-Sjöberg; "Notch Ductility of Mild Steel Ship Quality Plates", I. M. MacKenzie; "The Propagation of Brittle Fracture", T. S. Robertson and D. le M. Hunt; "Transverse Strength and Brittle Fracture", W. Soete; "Dimensions in Testing", C. F. Tipper; and "The Influence of Welding on Notch-Brittle Fracture", A. A. Wells.

10133 Brittle Fracture Studies in the United States. S. L. Hoyt. Paper from CONFERENCE ON BRITTLE FRACTURE IN STEEL. p. 145-161; disc., p. 326-397. 1953. West of Scotland Iron and Steel Institute, Glasgow. (TA465 C76)

Investigations in U. S. and their relation to work in rest of world. Basic principles and description of tests. Table, graph.

10134 Deformation of Single Crystals. Earl R. Parker and Jack Washburn. Paper from MODERN RESEARCH IN PHYSICAL METALLURGY. p. 186-204. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

New techniques for investigating deformation characteristics of metals. Photographs, graphs, diagrams, micrographs. 19 ref.

10135 High Speed Strain Measurements. G. R. Irwin. Paper from MODERN RESEARCH IN PHYSICAL METALLURGY. p. 205-224. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Recent experiments on rapid single pulse stressing of metals into plastic range illustrate most important factors in successful experimental work. Oscillograms, graphs, diagrams. 18 ref.

10136 The Metallurgical Use of Anelasticity. C. Wert. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 225-250. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Tells how measurements are made. Interprets results. Graphs, table, diagrams. 13 ref.

10137 Radiation Damage as a Metallurgical Research Technique. Sidney Siegel. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 312-324; disc., p. 325. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Order-disorder, and precipitation hardening. Cu alloys are cited in use of this method. Diagram, graphs, table. 16 ref.

See also:

9080 (thermal conductance between Al and stainless steel)
9481 (electrical resistance of steel)
9521 (hardness of Au-plate)
9850 (deformation of gear teeth)
9882 (properties of magnetic materials)
10001 (mechanical defects of die casting)
10013 (hardness of Stellite 21)
10152 (physical properties of Al-Fe alloys)
10188 (microhardness of WC-TiC-Cr_3C_2 solid solutions)
10189 (structural changes in metal during creep)
10221 (mechanical properties of Ti-H alloys)
10225 (hardness of Ti alloy)
10235 (textures of cold-rolled Al)
10311 (neutron cross sections of Fe and Ni)
10484 (load-deflection relations for steel joists)

METALS—MECHANICAL WORKING

10138 A New Look at Cutting Fluids. Harry N. Leave. *American Machinist*, v. 98, Mar. 1, 1954, p. 97-99.

Factors in selection of fluid for particular application.

10138a Why Would You Choose Hydraulic Presses? *American Machinist*, v. 98, Mar. 29, 1954, p. 116-126.

Basic reasons for increasing acceptance of modern hydraulic press for jobbing and production work. Diagrams, photograph.

10139 Beryllium. P. L. Lowenstein, A. L. Kaufman, and S. V. Arnold. *American Machinist*, v. 98, Apr. 12, 1954, p. 203-206.

Extrusion, rolling, and forging methods. Diagrams, photograph.

10140 Beryllium. Shields M. Bishop. *American Machinist*, v. 98, Apr. 12, 1954, p. 207-208.

Rolling and forging methods. Photographs.

10141* The Theory and Practice of Wire Drawing. I. Some Researches in Wire-Drawing. F. C. Thompson. *Australasian Engineer*, 1954, Feb., p. 42-49.

Consideration given to equation for work done during wire drawing. Drawing speed, die angle and load, area reduction, yield stress, and temperature. Graphs, photographs, diagrams, tables. 18 ref. (To be continued.)

10142* The Manufacture of Crankshafts by the Continuous Grain Flow Process. G. Cleghorn and I. H. Burnell. *Institute of Marine Engineers, Transactions*, v. 66, Mar. 1954, p. 49-58; disc., p. 58-64.

Method of operation; particulars of furnaces used for heating bars; straightening, inspection, and treatment of the crankshaft forging after it is completed; and actual test figures obtained from such crankshafts. Diagrams, photographs, table.

10143 Symposium on the Control of Quality in the Production of Wrought Non-Ferrous Metals and Alloys. II. The Control of Quality in Working Operations. *Institute of Metals, Journal*, v. 82, Mar. 1954, p. 281-344 + 3 plates.

Includes "Problems of the Control of Dimension, Shape, and Finish in the Rolling of Sheet and Strip and in the Drawing of Wire", Hugh Ford and J. G. Wistreich; "The Control of Quality in the Hot and Cold Rolling of Aluminum and Aluminum Alloys", F. King and A. N. Turner; "The Control of Properties and Structure in the Hot and Cold Rolling of Copper and Copper-Base Alloys", W. W. Kee; "Some Factors Affecting the Quality of Extrusions", Christopher Smith and Norman Swindells; and "Statistical Control in Metal-Working Operations", M. Whyte.

10144 Improved Forging Methods Save Steel, Raise Shell Output. W. G. Patton. *Iron Age*, v. 173, Apr. 8, 1954, p. 145-148.

Uses powerful, vertical all-steel presses in place of conventional pierce-and-upset, horizontal draw bench method. Photographs, diagram.

10145 Flexible Bar Mill Equipment Permits Fast Service, Close Control. W. G. Patton. *Iron Age*, v. 173, Apr. 15, 1954, p. 132-135.

Fully mechanized, efficient modern semi-continuous bar mill retains desirable versatility of hand-operated bar mill. Size range of ⅜ to 4½ in. is probably unique for steel industry. Tables, photographs.

10146 Mechanized Sheet and Tinplate Mills. John H. Mort. *Iron & Steel*, v. 27, Apr. 1954, p. 141-144.

Electrical energy consumption. Tables, graphs.

10147 Use of Oxyacetylene in Rolling Mills. R. L. Deily. *Iron and Steel Engineer*, v. 31, Mar. 1954, p. 83-90; disc., p. 90.

Uses for oxy-acetylene found to be economical in steel plant operations. Drawings, photographs, graph, table. 6 ref.

10148 Direct Rolling of Carbon Steel Ingots to Plates on Three-High and Four-High Plate Mills. Robert C. McMichael. *Iron and Steel Engineer*, v. 31, Mar. 1954, p. 91-99; disc., p. 99-102.

Operations show the four-high plate mill has many advantages over three-high unit. Tables, diagram, photographs. 12 ref.

10149 New Swedish Mill Designs and Layouts for Medium and Small Sections and Wire Rod. S. Erik M. Norlindh. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 391-405 + 20 plates.

Development of repeated rolling to a high degree of reliability including breakdown and leader ovals down to 0.2 in. wire rod at final speeds of 4,000 ft. per min. Essential new designs allow rolling of small ingots. Diagrams, drawings, photographs.

10150 Practical Experiences in the Use of Repeaters in a Looping Mill. Hans Wilhelm Riddervold. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 406-411.

Factors affecting working reliability when rolling with repeaters in 3-high and alternating 2-high mills. Sizes of reductions, guides, and repeaters. Photographs, graph, diagrams.

10151 The New Fagersta Wire-Rod Mill. K. E. Pihlblad. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 411-414.

Layout and operation of wire-rod mill. Methods used to achieve exact roll setting for Leufvén mill stands. Graph, tables, photograph, diagram.

10152 16 Percent Aluminum-Iron Alloy Cold Rolled in the Order-Disorder Temperature Range. Joseph F. Nachman and William J. Buehler. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 307-313.

Methods of fabricating from cast slab to thin-gauge sheet. Melting, casting, homogenizing, hot rolling, and cold rolling at 575 C and room temperature. Magnetic properties and oxidation resistance. Micrographs, photographs, oscillograms, diagrams, tables, graphs. 9 ref.

10153* A Study of the Role of the Cutting Fluid in Machining Operations. S. J. Beaubien and A. G. Cattaneo. *Lubrication Engineering*, v. 10, Apr. 1954, p. 74-79.

Cutting fluids were studied with the object of understanding the mechanisms which link fluid properties and metal cutting performance. Photographs, graphs, diagrams. 1 ref.

10154 The Manufacture of Small-Diameter and Other Special Precision Tubes. *Machinery (London)*, v. 84, Mar. 19, 1954, p. 575-585.

Methods employed with particular reference to hypodermic needle, capillary, Bourdon, high pressure, thin-wall, and multibore types. Photographs, micrograph.

10154a The Manufacture of Hypodermic Needle Tubing. *Machinery (London)*, v. 84, Apr. 2, 1954, p. 679-686.

Manufacture of small-diameter and other special types of precision tubes. Procedure subsequent to "pulling to gauge" is emphasized. Photographs.

10155 New Extrusion Techniques Developed. H. Albers, G. Krause, and A. Greensite. *Mechanical Engineering*, v. 76, Apr. 1954, p. 343-345.

Extrusion presses utilized to produce longitudinally tapered, step, and multi-shouldered extrusions, as well as combination die forgings and extrusions. Diagrams. 8 ref.

10156* Manufacture of Bright Drawn Bars and Conduits. Rolt Hammond. *Mechanical Handling*, v. 41, Apr. 1954, p. 180-186.

Mechanical handling of tubes for electric wiring up to a maximum diameter of 3-in. Photographs, drawings.

10157* Principles of Deep Drawing. (French.) B. Wassilieff. *Métallurgie et la construction mécanique*, v. 86, no. 3, Mar. 1954, p. 185-186, 189, 191.

Influence of outer radius and clearance of die and punch, diameter of mold, mold clamp, and redrawing. Diagrams, graph. 3 ref.

10158* The "Aptitude to Swaging" of Sheet Metal. II. (French.) Pierre Vauthier. *Métaux, Corrosion-Industries*, v. 29, no. 342, Feb. 1954, p. 57-65.

Relates "P.V.I." test to depth of necking, anisotropy, and extension. Diagrams, graphs. tables. (To be continued.)

10159* Research on Flame-Cutting With Block-Type Nozzles. (German.) E. Zorn. *Schweissen und Schneiden*, v. 6, no. 3, Mar. 1954, p. 105-108.

Comparison with efficiency of two-piece nozzles. Graphs, diagrams, photographs.

10159a Modern French Aluminium Foil Production. *Sheet Metal Industries*, v. 31, no. 324, Apr. 1954, p. 313-317.

Details of methods used at two French plants. Photographs.

10160 The Rolling of Metals and Alloys. I. Historical Development of the Rolling Mill. Eustace C. Larke. *Sheet Metal Industries*, v. 31, no. 324, Apr. 1954, p. 325-334, 338.

Concludes historical survey of ordinary-type continuous mills for rolling of wide strip. Photographs, diagram. 20 ref. (To be continued.)

10161* The Effect of Rolling Speed on Rolling Pressure, Strength Properties, and Strip Thickness in Cold Rolling of Strip Steel. (German.) Joseph Billigmann and Anton Pomp. *Stahl und Eisen*, v. 74, no. 8, Apr. 8, 1954, p. 441-461.

Experiments with five low-carbon open-hearth steels indicate pressure and thickness depends upon rate and lubrication of rolling. Form-change resistance and rise of strip temperature mutually compensate effect of rolling rate. Tables, graphs. 102 ref.

10162* Industrial Measurement of Wire Temperature on Multiple Drawing Machines. (German.) Anton Zastera. *Stahl und Eisen*, v. 74, no. 8, Apr. 8, 1954, p. 461-464.

Rapid and trouble-free method of measuring temperatures of wire during drawing operation. Diagrams, tables, graphs. 8 ref.

10163 Deep Draws Don't Follow Rules. J. Walter Gulliksen. *Steel*, v. 134, Mar. 1, 1954, p. 140-141.

Basic principles and variables to be considered. Diagrams, photographs.

10164 Guide for Machining Stainless Steels. I. J. D. Armour. *Steel*, v. 134, Mar. 22, 1954, p. 92-95.

Some free-machining types approach workability of Bessemer screw stock. Non-free-machining types offer top mechanical and corrosion properties. Photograph, diagrams, tables. (To be continued.)

10165 Metallurgical Requirements of Steels for Cold Extrusion. D. V. Wilson. *Steel Processing*, v. 40, Apr. 1954, p. 215-223, 255.

Phosphate coatings provide a satisfactory basis for lubrication of ferritic steels in severe cold-working operations. Primary limitations of process appear to lie in tool materials and tool design rather than in materials extruded. Graphs, photographs, micrographs, tables, diagrams. 15 ref.

10166* Basic Tooling for Spinning Metals. Francis L. Coenen. *Tool Engineer*, v. 32, Mar. 1954, p. 57-63.

Spinnability of metals, spinning blocks, rollers, hand tools, lubricants, and accessories. Photographs, diagrams, tables.

10167* Titanium, How to Deep Draw It. Carter C. Higgins. *Tool Engineer*, v. 32, Mar. 1954, p. 75-76.

Drawability of alloys, galling, seizing tendencies, die lubricants, and chemical treatment of drawing blanks. Photographs.

10168* Effect of Form of Working Surface of a Mandrel on the Process of Tube Expansion. (Russian.) Iu. G. Proskuriakov. *Vestnik Mashinostroeniia*, v. 34, no. 2, Feb. 1954, p. 43-49.

Various parameters and their effects on quality of surface. Diagrams, tables, graphs, photographs. 7 ref.

10168a Peening Investigations. *Welding Journal*, v. 33, Apr. 1954, p. 206S-208S.

Interpretive report by the Peening Committee, Welding Research Council, based upon two reports issued by Amer. Bureau of Shipping Laboratory and the Naval Research Laboratory. 6 ref.

10169* Forming Sections With Form Die Quenching. Joseph S. Corral. *Western Machinery and Steel World*, v. 45, Mar. 1954, p. 70-74.

Process produces extremely accurate contours in high-strength Al alloys; eliminates warpage and distortion normally occurring during water quenching. Photographs, drawings.

10169a* A Practical Analysis of the Causes of Die Wear in the Dry-Drawing of Ferrous Wires. E. P. Riley-Gledhill. *Wire Industry*, v. 21, Apr. 1954, p. 407 + 5 pages.

Improve die life with proper coatings or lubricants and alignment of ingoing wire. Tables, diagrams, photograph.

Metals—Mechanical Working

10170* Present Status of Hot Working of Cast Iron. (German.) Adalbert Wittmoser. *Zeitschrift für Metallkunde*, v. 45, no. 3, Mar. 1954, p. 127-136.

Shows that with proper methods most types of cast iron may be hot worked. Mechanical properties after treatments. Photographs, table, micrographs, graphs, diagrams. 32 ref.

10171* The Suitability of Different Fuel Gases for Oxygen Flame Cutting. (German and French.) Hans Georg Kunz. *Zeitschrift für Schweisstechnik*, v. 44, no. 3, Mar. 1954, p. 53-63.

Relative values of acetylene, illuminating gas, propane, and hydrogen. Effects on quality of the cut and properties of metals. Diagram, graphs, micrographs, photographs, tables. (To be continued.)

10172* The Suitability of Fuel Gases for Oxygen Cutting. (German and French.) Georg Kunz. *Zeitschrift für Schweisstechnik*, v. 44, no. 4, Apr. 1954, p. 83-86.

Shows acetylene to be most economical. Tables, graphs.

Books and Miscellaneous Publications

10173* Bibliography on Closed Die Forgings. 15 p. 1953. Loewy Construction Co., Inc., New York. (ZTS225 L82b2)

See also:
9217 (ultrasonic drilling)
9804 (bearing for rolling mills)
9875a (tool and die materials)
9967 (forming of Zn)
10039 (wear of drawing dies)
10395 (plastics for short-run tools)

METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES

10174 Cold-Rolled and Primary Recrystallization Textures in Cold-Rolled Single Crystals of Silicon Iron. (English.) C. G. Dunn. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 173-183.

Orientation changes. Oscillogram, tables, stereograms. 22 ref.

10175 Diffusion of Hydrogen in Mild Steel. (English.) Al. Demarez, Arthur G. Hock, and Francis A. Meunier. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 214-223.

Apparatus used for rapid determination of total H content and diffusion coefficient. Graphs, tables, diagram. 25 ref.

10176 The Crystallography of Martensite Transformations. III. Face-Centred Cubic to Body-Centred Tetragonal Transformations. (English.) J. S. Bowles and J. K. MacKenzie. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 224-234.

Geometrical theory previously developed is applied. Predictions of habit planes, orientation relationships, and other geometrical features compared with experimental data for Fe-C, Fe-Ni, and Fe-Ni-C alloys. Graph, diagrams, tables. 22 ref.

10177 Thermodynamics of the Liquidus and the Solidus of Binary Alloys. (English.) Carl Wagner. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 242-249.

If free energies of liquid and solid phase of binary alloy are given as functions of composition and temperature, liquidus and solidus may be derived from condition that partial molar free energies of each component must be equal in coexisting phases. 30 ref.

10178 On the Mechanism of Diffusion in Solid Solutions. (French.) C. Crussard. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 296-301.

By analyzing mechanism of thermal agitation and using theory based on interference of waves of thermal agitation, a satisfactory explanation of discrepancies in Arrhenius' law is possible. Graph. 7 ref.

10179 The Effects of Certain Alloying Elements on the Allotropic Transformation in Titanium. (English.) H. W. Worner. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 310-312.

Alloying elements with atomic sizes close to that of Ti. Change in enthalpy which accompanies transfer of one g.-atom of any given solute from β- to α-phase used to indicate effect of solute on α-β transformation. Graph. 10 ref.

10180 Recent Observations on the Motion of Small Angle Dislocation Boundaries. (English.) Douglas W. Bainbridge, Choh Hsien Li, and Eugene H. Edwards. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 322-333.

Boundaries in Zn crystals were investigated in temperature range −196 to 400 C. Boundaries moved by application of shear stress. Diagrams, photographs, graphs. 7 ref.

10181 The Interaction of Impurity Atoms With Dislocations in Germanium. (English.) A. D. Kurtz and S. A. Kulin. *Acta Metallurgica*, v. 2, no. 2, Mar. 1954, p. 352-354.

Existence of dislocations gives rise to certain specific distributions of solute atoms. Approximate calculation and model suggested. Table. 4 ref.

10182 Titanium-Nitrogen and Titanium-Boron Systems. A. E. Palty, H. Margolin, and J. P. Nielsen. *American Society for Metals, Transactions*, v. 46, 1954, p. 312-328.

On basis of metallographic, X-ray diffraction, and melting point data, Ti-N and Ti-B phase diagrams were delineated in respective composition regions up to 17.5% N and 33% B. Graphs, micrographs, tables. 20 ref.

10183 A Precipitation-Hardenable Copper-Nickel-Silicon-Aluminum Alloy. D. B. Roach, R. B. Fischer, and J. H. Jackson. *American Society for Metals, Transactions*, v. 46, 1954, p. 329-345; disc., p. 346-347.

Alloy can be readily formed in solution-treated condition and hardened by aging to have a proportional limit of 85,000 psi., a yield strength of 120,000 psi., and a tensile strength of 140,000 psi., with an elongation of 8%, and modulus of elasticity in tension of 19 million psi. Tables, graphs. 11 ref.

10184 The Phase Diagram of the System InAs-Sb. C. Shih and E. A. Peretti. *American Society for Metals, Transactions*, v. 46, 1954, p. 389-396.

Thermal analysis, metallographic and X-ray data. Graph, table, micrographs. 7 ref.

10185 The Angular-Appearing Carbides in High Speed Tool Steels. Carl J. McHargue, Joseph P. Hammond, and Charles S. Crouse. *American Society for Metals, Transactions*, v. 46, 1954, p. 716-726.

Particles present in high speed tool steels after overheating were studied in steels of types 18-4-1 and 6-5-4-2 and found to be of same crystal structure, and probably of similar composition, as carbides ordinarily reported for these steels. Tables, micrographs, graph. 11 ref.

10186* The Determination of the Texture of Sheet Steel From Torque Curves. L. R. Blake. *British Journal of Applied Physics*, v. 5, Mar. 1954, p. 95-104.

Torque curve used as means of control during mechanical working and heat treatment; orientation data obtained without elaborate analysis. Photographs, tables, diagrams, graphs. 11 ref.

10187 On the Primary Crystallization of Spheroidal Graphite Cast Iron. H. Gries and U. Maushake. *Henry Brutcher, Altadena, Calif., Translation no.* 3175, 19 p. (Condensed from *Giesserei, Technisch-Wissenschaftliche Beihefte*, 1953, no. 10, Mar., p. 493-502.)

Occurrence of graphite spheroids. Reviews literature on nuclei, crystal structure, and crystallization process. Micrographs, table. 50 ref.

10188 Contribution to System Tungsten Carbide-Titanium Carbide-Chromium Carbide. O. Rüdiger. *Henry Brutcher, Altadena, Calif., Translation no.* 3220, 7 p. (From *Metall*, v. 7, nos. 23-24, 1953, p. 967-969.

Previously abstracted from original. See item 5473, v. 3, Apr. 1954.

10189 Structural Changes in Metal During Creep. B. M. Rovinskii and L. M. Rybakova. *Henry Brutcher, Altadena,*

Calif., Translation no. 3224, 15 p. (From *Izvestiya Akademii Nauk SSSR*, OTN, 1953, no. 9, p. 1241-1247.)

Studies of Armco iron at 750 and 840 F and Ti-stabilized 18-8 steel at 1065 and 1155 F with residual deformations ranging from 0 to 7%. Graphs, micrographs. 7 ref.

10190* Appearance of the Surface of Polycrystalline Specimens Subjected to Work-Hardening and Then to Gradual Annealings. (French.) Jean Hérenguel. *Comptes rendus*, v. 238, no. 6, Feb. 8, 1954, p. 688-690.

Specimens of pure Al and Al-3% Mg alloy were deformed up to 400% by rolling. Surface textures were compared with specimens deformed by tension. Photographs. 6 ref.

10191* Relation Between Structure and Mechanical Properties During the Hardening of Aluminum-Silver Alloy. (French.) Bella Belbeoch and André Guinier. *Comptes rendus*, v. 238, no. 9, Mar. 1, 1954, p. 1003-1005.

X-ray study of an Al alloy with 38% Ag. Graph. 3 ref.

10192* Investigations on the Texture of Orientation and the Allotropic Transformation of Cobalt. (French.) Hervé Bibring and Francois Sebilleau. *Comptes rendus*, v. 238, no. 9, Mar. 1, 1954, p. 1026-1028.

Experiments on electrolytic Co with a purity greater than 99.5%, degassed at 1200 C for five days prior to any mechanical or heat treatment. Graph. 1 ref.

10193* Metallography of Cobalt-Base and Metallic-Carbide-Base Alloys. (French.) René Bernard and Colette Berger. *Comptes rendus*, v. 238, no. 11, Mar. 15, 1954, p. 1224-1226.

Specimens were diamond polished and treated with HCl, H_2SO_4, and H_2O_2. Constituents were readily distinguishable. Micrographs. 2 ref.

10194* Calculation of Intensity of the X-Ray Background at Various Degrees of Correlation in Solid Solutions. (Russian.) Iu. A. Bagariatskii. *Doklady Akademii Nauk SSSR*, v. 93, no. 1, Nov. 1, 1953, p. 35-38.

Verifies formula found by Lifshits and Obraztsov. Diffused maxima arise under clear selective maxima. 11 ref.

10195* Stabilization Phenomenon During Reverse Martensitic Transformation. (Russian.) Ia. M. Golovchiner and Iu. D. Tiapkin. *Doklady Akademii Nauk SSSR*, v. 93, no. 1, Nov. 1, 1953, p. 39-42.

Stabilization effect of α phase. Investigates annealing of Ni-Fe and Ni-Ti-Fe alloys at 1100 C for 4 hr., then cooling to −196C in liquid N. Graphs. 7 ref.

10196* Problem of the Passive, Orienting Influence of a Solid Base on Growing Crystals. (Russian.) P. A. Shumskii. *Doklady Akademii Nauk SSSR*, v. 93, no. 1, Nov. 1, 1953, p. 51-54.

Investigates passive type crystal growth of polycrystalline aggregates applicable to petrographic studies and to conditions of crystallization of alloys. Diagrams. 5 ref.

10197* Investigation of Plastically Deformed Crystals by Means of a Narrow Beam of X-Rays. (Russian.) E. V. Kolontsova. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 795-798 + 1 plate.

X-ray diffraction photographs utilizing a glass diaphragm with a slit of 10 to 15 microns width. Materials studied were monocrystals of Sn, Cd, Zn, Al, Ni, and AgCl. Graph, micrographs.

10198* Influence of Carbon on the Self-Diffusion of Iron in the Iron-Nickel System. (Russian.) P. L. Gruzin and E. V. Kuznetsov. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 809-812.

Coefficients of self-diffusion measured by means of a radioactive Fe^{59} isotope in range from 800 to 1300 C for alloys containing 20% Ni and in range from 1050 to 1330 C for alloys containing 25% Ni. Tables, graphs. 4 ref.

10199* Influence of the Rate of Heating on the Recrystallization of Steel. (Russian.) B. G. Sazonov. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 817-820.

A new concept based on orientation and dimensional correspondence of transforming phases and emergence of internal stresses connected with volumetric effect during formation of the new phase. Micrographs. 5 ref.

10200* Heats of Activation During the Diffusion of Boron Into Tungsten and Molybdenum. (Russian.) G. V. Samsonov. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 859-861 + 1 plate.

Specimens were heated in a B bath from 900 to 1300 C. Results reveal some regularity as observed for variation of other physical properties with change in completeness of the electron d-level of a transition metal and strength of retention of electrons by a metalloid. Graph, table, micrograph. 3 ref.

10201 The Mechanism of Metallographic Etching. I. The Reaction Potentials of a Two-Phase Brass in Various Etching Reagents. George L. Kehl and Max Metlay. *Electrochemical Society, Journal*, v. 101, Mar. 1954, p. 124-127.

Potentials generated by reaction of portions of small, single grains of each of the two phases of α-β brass with various etching solutions were measured. Potential of β phase is consistently 0.01 to 0.03 v. more anodic than that of the α phase in the same reagent. Micrographs, graph, table. 6 ref.

10202 Reaction of Nitrogen With, and the Diffusion of Nitrogen in, Thorium. A. F. Gerds and M. W. Mallett. *Electrochemical Society, Journal*, v. 101, Apr. 1954, p. 175-180.

Rates of reaction of N with Th for temperature range of 670 to 1490 C at atmospheric pressure. Rates of diffusion of N in Th over the temperature range of 845 to 1490 C at atmospheric pressure. Micrograph, graphs, tables. 13 ref.

10203 How Dissolved Nitrogen Affects Graphitization. G. V. Smith. *Iron Age*, v. 173, Apr. 15, 1954, p. 136-139.

Nitrogen dissolved in Al-killed steel inhibits graphitization Instability of Fe_3C is the graphitization problem. Table, micrographs, graph.

10204 Kinetics of First-Stage Graphitization in Iron-Carbon-Silicon Alloys. J. Burke and W. S. Owen. *Iron and Steel Institute, Journal*, v. 176, Feb. 1954, p. 147-155.

Experimental studies throw new light on processes controlling rate of reaction. Tables, graphs, diagrams, micrograph. 18 ref.

10205 Effect of Hydrogen on the Continuous-Cooling Transformation Diagram for a Manganese-Molybdenum Steel. C. L. M. Cottrell. *Iron and Steel Institute, Journal*, v. 176, Mar. 1954, p. 273-282 + 1 plate.

Diagrams cover range of cooling rates occurring during normal arc-welding process and were observed for steel both with and without supersaturation with H. Probable effects of H on hard-zone cracking. Tables, diagram, graphs, micrographs. 19 ref.

10206 Structural Changes During Annealing of White Cast Irons of High S:Mn Ratios, Including the Formation of Spherulitic and Non-Spherulitic Graphite and Changes in Sulphide Inclusions. Axel Hultgren and Gustaf Östberg. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 351-365 + 11 plates.

Mechanism of formation of dispersed graphite flake nests, compact graphite nests, and graphite spherulites during annealing at 900 to 1150 C of white cast irons was studied by examining microstructures of quenched specimens. Graphs, diagrams, tables, micrographs. 20 ref.

10207 Eutectic Solidification in Gray, White, and Mottled Hypo-Eutectic Cast Irons. A. Hultgren, Y. Lindblom, and E. Rudberg. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 365-374 + 8 plates.

Samples quenched at predetermined points on cooling curves. Sections examined for evidence of processes occurring during cooling. Micrographs, tables, graphs, diagram. 6 ref.

10208 Undercooled Graphite in Cast Irons and Related Alloys. H. Morrogh and W. J. Williams. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 375-378 + 2 plates.

Develops view that undercooled graphite is formed by decomposition of white-iron structure shortly after solidification. Composition of silico-carbide. Graph, micrographs. 8 ref.

Metals—Metallography, Transformations, and Structures

10209 The Solidification of Nodular Iron. H. Morrogh. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 378-382 + 2 plates.

Cooling-curve and quenching experiments indicate graphite nodules may form directly from liquid. Sites of decomposed carbide may be recognized by segregation of Ni. Various solidification sequences are suggested. Micrographs, table, graph. 7 ref.

10210 The Solidification of Iron-Phosphorus-Carbon Alloys. H. Morrogh and P. H. Tütsch. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 382-384 + 2 plates.

In place of normal ledeburite, P in small amounts causes formation of degenerate eutectic structure. In large amounts it gives rise to austenite dendrites and cementite of hyper-eutectic appearance. Table, micrographs, diagram. 4 ref.

10211 Decomposition of Cementite During Solidification of Cast Iron. A. Berman and V. Kondic. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 385-387.

Origin of graphite in cast iron investigated by comparing time required for graphite to form on cooling with that required for cementite to decompose at eutectic temperature. Micrograph, graph, diagrams. 6 ref.

10212 The Growth of Nodular Graphite. M. Hillert and Y. Lindblom. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 388-390 + 1 plate.

Graphite spherulites grow by screw dislocations generated by the inclusion of foreign atoms in graphite lattice. Autoradiography shows rare-earth elements to be uniformly distributed through spherulites present in Ni-C alloy treated with misch metal. Photograph, diagrams, micrographs. 6 ref.

10213 Metallography of Delta-Ferrite. I. Eutectoid Decomposition of Delta-Ferrite. Kehsin Kuo. *Iron and Steel Institute, Journal*, v. 176, Apr. 1954, p. 433-441 + 4 plates.

Delta-ferrite in high-Mo steel decomposed in eutectoid manner within temperature range 900 to 1150 C, giving austenite and the Fe_3Mo_3C carbide. Suggests slow diffusion of Mo is controlling factor for three internally connected transformations. Micrographs, table, graphs. 28 ref.

10214* The Effect of Deformation, Temperature, and Chemical Composition on the Formation of Martensite in Austenitic Stainless Steels. (Swedish.) Tryggve Angel. *Jernkontorets Annaler*, v. 138, no. 3, 1954, p. 117-141.

Experimental studies of isothermal martensite formation as a function of strain, stress, and deformation energy. Graphs, micrographs, table, diagram. 28 ref.

10215 Radiation Damage Effects on Order-Disorder in Nickel-Manganese Alloys. Lewis R. Aronin. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 344-349.

Fast neutron irradiation in nuclear reactor on order-disorder series of Ni-Mn alloys ranging from 16.5 to 31.9 at. % Mn studied by resistivity and magnetic induction measurements. Graphs. 16 ref.

10216 Diffusion of Gold Into Copper. A. B. Martin, R. D. Johnson, and Frank Asaro. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 364-369.

Radioactive tracer techniques utilized to measure rate of diffusion over temperature range from 1000 to 375 C. Graphs, tables. 19 ref.

10217 Magnetic Susceptibilities of Np^{+6}, Np^{+5}, and Np^{+4}. Dieter M. Gruen and Clyde A. Hutchison, Jr. *Jorunal of Chemical Physics*, v. 22, Mar. 1954, p. 386-393.

Susceptibilities of ions compared with those calculated for ions in electronic states of *f*-electron configurations in presence of electric fields of specific forms and with various amounts of spin-orbit coupling. Table, graphs. 23 ref.

19218 Electronic Structure, Infrared Absorption, and Hall Effect in Tellurium. Herbert B. Callen. *Journal of Chemical Physics*, v. 22, Mar. 1954, p. 518-522.

Analysis of the band structure of Te based on symmetry properties of a drastically simplified model of its crystal structure. Symmetry considerations lead to suggestions of physical mechanisms underlying a variety of experimental facts. Diagrams, tables. 9 ref.

10219 Phases in Titanium Alloys Identified by Cumulative Etching. Elmars Ence and Harold Margolin. *Journal of Metals*, v. 6, Mar. 1954, p. 346-348.

Techniques and advantages of process for use in phase diagram work. Diagram, micrograms, tables. 5 ref.

10220 Occurrence of Silicon Carbide in the Fe-C-Si System. James C. Fulton and John Chipman. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Mar. 1954, p. 356-357.

Data on phase relations. Table, micrographs. 2 ref.

10221 Constitution and Mechanical Properties of Titanium-Hydrogen Alloys. G. A. Lenning, C. M. Craighead, and R. I. Jaffee. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Mar. 1954, p. 367-376.

Hydrogen has little effect on tensile properties, but decreases notch-bar toughness to a large degree. Latter effect appears to be result of increased notch sensitivity. Tables, micrographs, graphs. 11 ref.

10222 Silver-Uranium System. R. W. Buzzard, D. P. Fickle, and J. J. Park. *Journal of Research, National Bureau of Standards*, v. 52, Mar. 1954, p. 149-152.

Phase diagram Ag-U constructed from data obtained by thermal analysis, metallographic examination, and X-ray diffraction. Tables, graphs, micrographs, photograph. 5 ref.

10223 A Precision 19 Cm X-Ray Diffraction Camera. J. Adam. *Journal of Scientific Instruments*, v. 31, Apr. 1954, p. 131-132.

Design is free of eccentricity and film mounting errors. Usual knife edges are replaced by reference marks. Diagrams, graph.

10224* Investigation of Electrolytic Condenser Foils. (German.) L. Holik and H. Nowotny. *Metall*, v. 8, nos. 5-6, Mar. 1954, p. 180-184.

Evaluation of experiments on etching of Al foils for X-ray and metallographic examination. Graphs, tables, micrographs, photographs. 7 ref.

10225 Hardness and Microstructure of an Alpha-Beta Titanium Alloy Quenched From Temperatures in the Range 600°-1,000°C. A. Greenwood and W. Evans. *Metallurgia*, v. 49, no. 293, Mar. 1954, p. 124-126.

Minimum hardness at 700 C and progressive increase to 950 C. Beta grain growth occurred after completion of α-β transformation. Limited amount of reversion of β to α took place on quenching. Table, graph, micrographs.

10226* Present State of Metallography of Alloyed Austenites, Particularly in 18/8 Steels. III. Martensite-Type Reactions in Austenites Having a High Content of Alloying Elements. (French.) Paul Bastien and Jacques Dedieu. *Métaux, Corrosion-Industries*, v. 29, no. 342, Feb. 1954, p. 49-56.

Graphic representation of anisothermal reaction. Cold-hardening and isothermal martensitic reactions at low temperatures. Graphs, micrographs. 26 ref.

10227 Changes in the Lattice Parameter of Polycrystalline Solid Solutions and Intercrystalline Internal Adsorption. V. I. Arkharov and N. N. Skornyakov. *National Science Foundation Translation no.* 96, Oct. 1953, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 89, 1953, p. 841-844.)

Introducing Sb into a Cu-base alloy markedly increased lattice parameter of Cu; Be decreased it; Fe caused no preceptible change. Table. 7 ref.

10228 The Nonsteady Rate of Nucleation of a New Phase Under Great Supercooling. B. Ya. Lyubov. *National Science Foundation Translation no.* 109, Nov. 1953, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 91, 1953, p. 245-248.)

Experiments show high-temperature phase may be preserved at low tempeartures for a long time in a metastable state. Graph. 3 ref.

10229 Diffusivity and Solubility of Copper in Germanium. C. S. Fuller, J. D. Struthers, J. A. Ditzenberger, and K. B. Wolfstirn. *Physical Review*, v. 93, ser. 2, Mar. 15, 1954, p. 1182-1189.

Function of temperature in range 700 to 900 C, by resistivity and radioactivity methods. Results account for changes occuring in resistivity of Ge upon heat treatment. Diagram, graphs, radiographs, table. 35 ref.

10230* Recrystallization of Germanium From Indium Solution. Jacques I. Pankove. *RCA Review*, v. 15, Mar. 1954, p. 75-85.

Upon cooling a Ge-in-In solution in contact with solid Ge, Ge from the supersaturated solution recrystallized onto the solid crystal in epitaxial fashion. Micrographs, photographs, diagrams. 1 ref.

10231* Study of Submicroscopic Precipitation in Heat-Resistant 80:20 Type Nickel-Chromium Alloys. (French.) Y. Baillie and J. Poulignier. *Revue de métallurgie*, v. 51, no. 3, Mar. 1954, p. 179-190; disc., p. 190-191.

Method is delicate enough to give sharp pictures of precipitate developed. Micrographs, graphs. 8 ref.

10232 Spiral Growths on Large Crystal Surfaces. Helen Rae and A. E. Robinson. *Royal Society, Proceedings*, v. 222, ser. A, Mar. 23, 1954, p. 558-562 + 2 plates.

Investigates twinning occurring in $Li_2So_4 \cdot H_2O$ crystals. Twinning is associated with high supersaturation in nutrient solution and is frequently accompanied by spontaneous microcrystallization. Diagrams. 2 ref.

10233* Formation of Spheroidal Graphite in Cast Iron by Washing the Melt With Argon. (German.) P. König and B. Marincek. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 2, Feb. 1954, p. 41-44.

Argon was passed into superheated melt. Table, micrographs.

10234 An Investigation of Lamellar Structures and Minor Phases in Eleven Cobalt-Base Alloys Before and After Heat Treatment. J. W. Weeton and R. A. Signorelli. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3109, Mar. 1954, 50 p. (TL570 Un3t)

Studies by metallographic and X-ray diffraction. Tables, graphs, micrographs. 16 ref.

10235* Investigation of Rolling and Recrystallization Textures of Aluminum. I. Textures of Cold Rolled Pure Aluminum. (German.) Kurt Lücke. *Zeitschrift für Metallkunde*, v. 45, no. 2, Feb. 1954, p. 86-92.

Compares results with other studies. Diagrams. 16 ref.

10236* The Three-Component System Titanium-Tungsten-Carbon. (German.) Hans Nowotny, Erwin Parthé, Richard Kieffer, and Friedrich Benesovsky. *Zeitschrift für Metallkunde*, v. 45, no. 3, Mar. 1954, p. 97-101.

Structure explained by X-ray diffraction and determination of melting points. Graphs, diagrams. 12 ref.

10237* Diffusion Phenomena in Powder Metal Blanks. (German.) Horst Schreiner and Johann Mariacher. *Zeitschrift für Metallkunde*, v. 45, no. 3, Mar. 1954, p. 108-111.

Contact method developed by R. Lindner using radioactive Ag^{110}-Cu. Table, graph, radiograph. 8 ref.

10238* Crystalline Form of Tungsten Carbide and the Distribution of Carbon Atoms in the Lattice. (German.) Hans Pfau and Walter Rix. *Zeitschrift für Metallkunde*, v. 45, no. 3, Mar. 1954, p. 116-118.

Investigation indicated probable location of C atoms. Photographs. 3 ref.

10239* The Structure of Amorphous Antimony. (German.) H. Richter, H. Berckhemer, and G. Breitling. *Zeitschrift für Naturforschung*, v. 9a, no. 3, Mar. 1954, p. 236-252 + 2 plates.

Preparation by vapor-deposition. Studies by X-ray method. Diagrams, graphs, tables, photographs, micrographs. 31 ref.

10240* Solubility of Hydrogen in Alloys. I. Method of Measuring and Investigation of $MgCu_2$-$MgZn_2$ and $MgNi_2$-$MgZn_2$ Systems. (German.) K. H. Lieser and H. Witte. *Zeitschrift für physikalische Chemie*, v. 202, nos. 5-6, Jan. 1954, p. 321-351.

Volumetric method of measuring solubility as function of time at constant pressure permits study of kinetic processes. Tables, graphs, diagram.

10241* X-Ray Investigation of Alloys in the System Aluminum-Palladium. (Russian.) Iu. P. Simanov. *Zhurnal Fizicheskoi Khimii*, v. 27, no. 10, Oct. 1953, p. 1503-1509.

Test specimens prepared from fine filings pressed into cylinders. Tables. 6 ref.

10242* Migration and Distribution of Components of Metal Alloys in an Electric Field. (Russian.) S. I. Drakin. *Zhurnal Fizicheskoi Khimii*, v. 27, no. 10, Oct. 1953, p. 1586-1591.

State of equilibrium and kinetics of electrodiffusion. Differences of average ion charges in various alloys. Graphs, table. 18 ref.

Books and Miscellaneous Publications

10242a Modern Research Techniques in Physical Metallurgy. 335 p. 1952. American Society for Metals. Cleveland. (TN690 Am35m)

Research methods including optical and electron microscopy; electron, X-ray and neutron diffraction; single crystal, crystal boundary, and deformation procedures; and ferromagnetic and radioactive methods.

10243 Optical Microscopy. George L. Kehl. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 1-32. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Phase contrast microscopy and reflecting-type objective. Micrographs, diagrams. 35 ref.

10244 Field Emission Microscopy. Erwin W. Müller. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 33-50. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Instrument produces magnifications of 500,000 times. Due to unique current density of field emission, pictures are bright enough to be photographed with motion picture camera at ordinary frame speed or to be projected on a large screen in an auditorium. Diagrams, micrographs. 9 ref.

10245 Electron Diffraction and Microscopy of Metals. R. D. Heidenreich. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 51-71. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Techniques and methods of examining metal surfaces by electron diffraction and electron microscopy. Diagram, graph, electron diffraction patterns. 19 ref.

10246 X-Ray Diffraction Techniques. Charles S. Barrett. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 72-94. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Considers high intensity and high brilliance X-ray tubes, monochromators, and various types of counting tubes for intensity measurement. Oscillogram, diagrams, microradiograph. 55 ref.

10247 The Diffuse Scattering of X-Rays. B. E. Warren and B. L. Averbach. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 95-130. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Scattering in a metal or alloy with cubic structure for disorder data. Diagrams, graphs, tables. 22 ref.

10248 Crystal Orientation and Pole Figure Determination. A. H. Geisler. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 131-153. 1952. American Society for Metals, Cleveland. (TN690 Am35m)

Studies of mechanical and physical properties, deformation, recrystallization, grain growth, solid-state transformations, corrosion rates, and diffusion frequently involve crystal orientation determination. Photographs, diagrams, graphs. 34 ref.

Metals—Metallography, Transformations, and Structures

10249 Techniques and Applications of Neutron Diffraction. C. G. Shull. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 154-169. 1952. American Society for Metals, Cleveland. (TN690 Am35m)
Compares neutron, X-ray, and electron diffraction. Usefulness of neutron techniques illustrated by a series of applications. Table, graphs, diagrams, photograph. 11 ref.

10250 Crystal Growth and Crystal Boundary Techniques. Bruce Chalmers. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 170-183; disc., p. 184-185. 1952. American Society for Metals, Cleveland. (TN690 Am35m)
Methods for preparation of single crystals include growth from vapor and solution, solidification of a melt, and rearrangement of atoms in solid state. Diagrams. 19 ref.

10251 Ferromagnetic Domains. H. J. Williams. Paper from MODERN RESEARCH TECHNIQUES IN PHYSICAL METALLURGY. p. 251-277. 1952. American Society for Metals, Cleveland. (TN690 Am35m)
Method of observing structures and changes in structures as magnetic field is varied. Effect of stress can also be observed. Diagrams, micrographs, graph. 23 ref.

See also:
9362 (crystals with sub-structures)
9516 (hydrogen-metal solutions)
9711 (crystal perfection)
10013 (transformations in Stellite 21)
10108 (transformations in Stellite 21)
10129 (band structure of transition metals)

METALS—POWDER

10252 Principal Types of Phase Diagrams for Titanium-Base Binary Systems. I. I. Kornilov. *Henry Brutcher, Altadena, Calif., Translation no.* 3201, 7 p. (From *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 549-551.)
Previously abstracted from original. See item 3937, v. 3, 1954.

10253* Determination of the Grain-Size Classification of a Crystalline Powder by X-Ray Diffraction. (French.) René Bernard and Raymond Rivière. *Comptes rendus*, v. 238, no. 6, Feb. 8, 1954, p. 666-669.
Results of experiments with WC. Graphs. 5 ref.

10254* Fabrication and Qualities of Sintered Aluminum Powder. (French.) A. von Zeerleder. *Metallurgia italiana*, v. 46, no. 1, Jan. 1954, p. 7-8.
Characteristics, production, and uses.

10254a Single, Solid Pieces of Cemented Carbide Produced on Hot Press. *Modern Industrial Press*, v. 16, Apr. 1954, p. 32.
Operation of press for production of pieces up to 4000 lb. Photographs.

10255 Pore-Size Distribution of Porous Iron. P. Swietering and H. L. T. Koks. *Nature*, v. 173, Apr. 10, 1954, p. 683-684.
Penetration of Hg under pressures up to about 1,000 atmospheres is especially suited for determination of pore sizes greater than 100 A. Tables, graphs. 3 ref.

10256* Production and Properties of Electrolytic Iron Powder. (German.) Ivan Ljungberg. *Stahl und Eisen*, v. 74, no. 5, Feb. 25, 1954, p. 279-285.
Method of varying properties over a wide range. Table, graphs, diagram. 15 ref.

10257* Technical Sintering Materials From the System Fe-Cu. (German.) Gerhard Zapf. *Stahl und Eisen*, v. 74, no. 6, Mar. 11, 1954, p. 338-347.
Strength properties approximate those of rolled steel. Tables, photographs, diagram, graphs. 21 ref.

10258* Investigation of Sintering Phenomena by Using Radioisotopes. (German.) Horst Schreiner and Gottfried Glawitsch. *Zeitschrift für Metallkunde*, v. 45, no. 3, Mar. 1954, p. 102-108.
Methods, equipment, and application to difficult powder metallurgical problems. Diagram, table, graphs. 11 ref.

10259* Anisotropy of Electric Conductivity in Some Powder Metal Contact Materials. (German.) Albert Keil and Carl-Ludwig Meyer. *Zeitschrift für Metallkunde*, v. 45, no. 3, Mar. 1954, p. 119-122.
Effect of composition, method of preparation, and other factors on Ag-graphite mixtures. Diagrams, micrographs. 5 ref.

10260* Kinetics of Sintering. (German.) Johannes Gerlach and Ottmar Knacke. *Zeitschrift für Metallkunde*, v. 45, no. 3, Mar. 1954, p. 123-127.
Investigation by press welding of Cd blanks. Influence of pressure and temperature on strength of the weld. Analysis of welding process. Diagram, graphs, micrograph. 27 ref.

See also:
9437 (cemented carbides for corrosion resistance)
9868 (comminution of metals)
10237 (diffusion in powdered-metal blanks)

MINING ENGINEERING

10261* Rock-Drilling With Hard Metals. E. J. Sandford and J. R. Wiles. *Alloy Metals Review*, v. 8, Mar. 1954, p. 2-7.
Developments in properties of hard metals; and problems involved in use of carbide tipped rock drills including tip, steel stem, and joint between them. Photograph, graphs, micrographs. 3 ref.

10262* Hard-Rock Drilling. L. L. Payne and W. Chippendale. *American Petroleum Institute, Proceedings*, sec. IV. Production, v. 33, 1953, p. 62-69.
Study of characteristics of formation being drilled which cause it to be termed "hard rock." Since physical properties of rock at surface, may not represent properties as presented to the rock-bit cutters, it is important to study nature of the changes in properties. Photographs, graphs, tables. 1 ref.

10263* Recent Novel Developments and Experiments in the Mining Industry. E. H. Browne. *Colliery Guardian*, v. 188, Mar. 4, 1954, p. 253-261.
Equipment and techniques for coal mining, loading, conveying, and power stowing. Photographs, drawings. (To be continued.)

10264* Measurement of Air Flow. The Use of Vane Anemometers. J. Swirles and F. B. Hinsley. *Colliery Guardian*, v. 188, Mar. 18, 1954, p. 319-326.
Abstract of a paper presented at Midland Counties Institution of Engineers, Nottingham, Jan. 1954. Shows that properly calibrated and used instruments can be relied upon to give reasonably accurate results. Tables, graphs, photographs. (To be continued.)

10265* Research on Drilling Fluids. *Drilling Contractor*, v. 10, Apr. 1954, p. 57-59.
Research program of American Assoc. of Oilwell Drilling Contractors, to be carried out by Battelle Memorial Institute.

10266 Illinois Mining Institute, Proceedings (Annual Volume), v. 61, 1953. 180 p. Illinois Mining Institute, Chicago.
Includes "Safety Digest", Murrell Reak; "Coal For Kilowatts", M. B. Covell; "Belt Conveyor Fires and Possible Preventive Measures in Underground Coal Mines", E. R. Traxler; "Reclamation of Abandoned Works Through the Use of Roof Bolts", Wm. C. Campbell; "Lifting Our Sights", Kenneth McFarland; "Coal's Outlook: 54 Per Cent More Demand"; "Face Preparation Problems in Western Kentucky", W. L. Husk; "A Complete Belt Coal Mine", Joe Graggs; "Mining and Preparation Factors in Illinois", Clayton F. Slack; "Vertical Highwall Drilling", G. H. Utterback; "Coal Haulage Costs", A. S. McClimon; "Central Management vs. Unit Supervisory Control", Paul Weir; "The Land Use and Water Technical Committee", T. C. Cheasley; "Benefits of a Safety Campaign to a Mine", A. G. Gossard; "Underground Oil House Simplifies

Supplying"; "More Light for Coal Mines", Thomas Allen; "Light Furnished the Underground Worker From the Beginning of Mining to 1950", Graham Bright; and "How Drive Design Improves", R. R. Richart.

10267* A New Instrument for Measuring Deviations of Deep Bore Holes. (Swedish.) E. Roxström. *Jernkontorets Annaler*, v. 138, no. 3, 1954, p. 159-174.

Accuracy and application of Craelius electromagnetic instrument. Table, diagram, photographs, graphs. 5 ref.

10268* Coal Breaking With Chemicals. *Mechanization*, v. 18, Mar. 1954, p. 77-79.

New method produces a maxmium-quality product while creating a minimum of handling and storage problems. Photographs.

10269 When Is It Practicable to Drill With Air and Gas? L. S. Fuller. *Oil and Gas Journal*, v. 52, Apr. 5, 1954, p. 110-111.

Equipment, operating techniques, and applications.

10270 How Mud Properties Affect Drilling Rate. John R. Eckel. *Oil and Gas Journal*, v. 52, Apr. 12, 1954, p. 131-132, 134, 136.

Varied mud properties bring about faster drilling. Graphs. 6 ref.

10271 Mine Pumping Plants. Anthracite Region of Pennsylvania. S. H. Ash, C. S. Hower, D. O. Kennedy, and W. H. Lesser. *U. S. Bureau of Mines, Bulletin* 531, 1953, 151 p. + 8 plates. (TN21 Un3b)

Covers water removal for eight year period. Data on volume and quality of anthracite mine water. Tables, graphs, photographs.

See also:
9636 (mining of Sn—book)
9708 (recovery of petroleum)
9835 (deep-well pumps in mining)

NONDESTRUCTIVE TESTING

10272* The Ultrasound-Impulse Reflection Process of Non-destructive Materials Testing. I. The Testing Device. (German.) A. Lutsch. *Archiv für technisches Messen*, 1954, no. 218, Mar., p. 67-70.

Circuits and design of a Reflectoscope. Photographs, diagrams, tables. 13 ref .

10273 The Ultrasonic Testing of Forging Ingots. Robert N. Hafemeister. *ASTM Bulletin*, 1954, no. 197, p. 52-55.

Tests determine soundess of ingot prior to forging. Oscillograms.

10274 The Correlation of the Betatron With Other Forms of Non-Destructive Testing. H. B. Norris. *ASTM Bulletin*, 1954, no. 197, p. 56-57.

Increased value of tests such as magnetic particle, ultrasonic, and X-ray results when used in conjunction with the betatron.

10275 Correlation of Gamma Radiography and Magnaflux Indications in the Inspection of Large Cast-Steel Connecting Rods. R. L. Thompson. *ASTM Bulletin*, 1954, no. 197, p. 58-59.

Detection of severe shrinkage cracking in a large steel casting. Correlation resulted in greater information. Photographs.

10276* Non-Destructive Internal Exploration of Mixed Materials. (French.) Nöel L. Lebrec. *Comptes rendus*, v. 238, no. 10, Mar. 8, 1954, p. 1113-1115.

Investigates reinforced concrete by radiation from Ir^{192} and Co^{60}. Radiographs.

10277* Application of Radio-Active Isotopes to Steel Foundry Radiography. L. Wilkinson. *Engineer*, v. 197, Mar. 12, 1954, p. 383-387.

Properties of Co^{60}, Ta^{182}, and Ir^{192} are largely complementary enabling thicknesses ranging from ½ to 5 in. of steel to be examined with adequate contrast and sensitivity. Tables.

10278* Technical Progress and Economic Aspects of Gamma-Ray Radiography. (French.) C. G. Carlström. *Fonderie*, 1954, Feb., no. 97, p. 3791-3802.

Outlines Swedish research in 1950-52. Sources of radiation, particularly Tm^{170}; diffused radiation; sensitivity; and favorable economic aspects. Graphs, tables, diagrams, radiographs. 12 ref.

10279* Determination of Best Conditions for Examining Cast Iron by Gamma-Ray Radiography by Means of Co^{60}. (French.) Albert Blondel and Pierre Broquet. *Fonderie*, 1954, Feb., no. 97, p. 3803-3818; disc., p. 3818-3819.

Possible use for non-destructive testing in the foundry. Power of detection techniques and experimental results. Radiographs, tables, diagrams, graphs. 12 ref.

10280 New Device Sorts Metals Accurately, Quickly. E. F. Weller and E. A. Hanysz. *Iron Age*, v. 173, Mar. 4, 1954, p. 162-165.

Non-destructive testing device accurately sorts mixed metals. Plating, foil, and non-conductive film thickness can be measured. Photographs, graphs, diagrams, tables.

10281* A Preliminary Investigation of the Radiographic Visualization of Cracks. James W. Dutli and Gerold H. Tenney. *Nondestructive Testing*, v. 12, Mar.-Apr. 1954, p. 13-15.

Apparatus, techniques, and results of experimental studies. Diagrams, graphs, photograph.

10282* Some Unusual Radiographic Problems. M. D. Phillips, M. L. Rhoten, and Clara Kimmel. *Nondestructive Testing*, v. 12, Mar.-Apr. 1954, p. 17-19.

Reviews and illustrates typical problems encountered in an X-ray laboratory. Radiographs, photographs.

10283* Application of Cesium 137 to Industrial Radiography. James W. Dutli and Grover M. Taylor. *Nondestructive Testing*, v. 12, Mar.-Apr. 1954, p. 35-38.

Fission-product isotope Cs^{137} for use as γ-ray source for industrial radiography. Diagram, graphs, radiographs, tables. 6 ref.

10284* An Investigation of Xeroradiography of Uranium With High Energy Sources. R. E. Cofield. *Nondestructive Testing*, v. 12, Mar.-Apr. 1954, p. 39-43.

Exposure conditions and operating techniques for xeroradiography of 0.125 to 1 in. U test objects were developed by using both 1,000 kv. X-ray and Co^{60} sources. Tables, diagrams, xeroradiograph, graphs. 3 ref.

10285* New Non-Destructive Process for Determining Residual Stresses of Surfaces. (French.) L. Hausseguy and H. Martinod. *Recherche Aéronautique*, 1954, no. 37, Jan.-Feb., p. 43-50.

Exact determination of "Hertzian hardness" as related to elastic limit. Diagrams, graphs, photograph, tables. 8 ref.

10286* Extended Application of Non-Destructive Testing of Welds. (German.) Otto Vaupel. *Schweissen und Schneiden*, v. 6, no. 3, Mar. 1954, p. 108-113; disc., p. 113-115.

Use of radioactive materials, combination of ultrasonic frequencies with X- and γ-rays, and fluorescent magnetic powder. Table, diagrams.

Books and Miscellaneous Publications

10286a Symposium on Non-Destructive Testing. ASTM Special Technical Publication no. 145. 98 p. 1952. American Society for Testing Materials, Philadelphia. (TA410 Am35Sn) Fluoroscopy; electronic sorting; quantitative evaluation of defects; ultrasonic methods; and weld radiography.

10287 Fluoroscopy and Radiography With Iridium 192. C. Garrett, A. Morrison, and G. Rice. Paper from SYMPOSIUM ON NON-DESTRUCTIVE TESTING. ASTM SPECIAL TECHNICAL PUBLICATION no. 145. p. 9-20. 1952. American Society for Testing Materials, Philadelphia. (TA410 Am35Sn)

Preparation of source; protective equipment; operating techniques. Diagrams, graphs, photographs, tables, radiographs. 7 ref.

Nondestructive Testing

10288 Weld Radiography. A Tentative Method for the Quantitative Evaluation of Defects. Oscar Masi. Paper from SYMPOSIUM ON NON-DESTRUCTIVE TESTING. ASTM SPECIAL TECHNICAL PUBLICATION no. 145. p. 21-30. 1952. American Society for Testing Materials, Philadelphia. (TA410 Am35Sn)

Mechanical properties of welds determined by photometric studies of radiographs. Diagrams, photograph, radiographs, tables.

10289 Critical Study of Techniques for the Testing of Materials by Ultrasonic Methods. Paul G. Bastien. Paper from SYMPOSIUM ON NON-DESTRUCTIVE TESTING. ASTM SPECIAL TECHNICAL PUBLICATION no. 145. p. 31-42. 1952. American Society for Testing Materials, Philadelphia. (TA410 Am35Sn)

Trends in testing methods and consideration of errors caused by conditions of the ultrasonic emission on characteristics of the object tested. Diagrams, tables.

10290 Comparison of Non-Destructive Tests on a Damaged Sternpost. A. De Sterke and H. Den Hartog. Paper from SYMPOSIUM ON NON-DESTRUCTIVE TESTING. ASTM SPECIAL TECHNICAL PUBLICATION no. 145. p. 43-52. 1952. American Society for Testing Materials, Philadelphia. (TA410 Am35Sn)

Heavy steel castings in damaged ships were inspected by magnetic; γ- and X-ray; and ultrasonic methods. Results compared. Photographs, diagrams, radiographs.

10291 Progress in the Field of Non-Destructive Testing Through the Use of Ultrasonics. W. C. Hitt. Paper from SYMPOSIUM ON NON-DESTRUCTIVE TESTING. ASTM SPECIAL TECHNICAL PUBLICATION no. 145. p. 53-75. 1952. American Society for Testing Materials, Philadelphia. (TA410 Am35Sn)

General review. Immersed scanning, flaw parallelism, reference blocks, sweep operation, and typical parts inspected. Photographs, diagrams, reflectograms.

10292 The Practical Application of Ultrasonic Non-Destructive Testing. Werner A. Felix. Paper from SYMPOSIUM ON NON-DESTRUCTIVE TESTING. ASTM SPECIAL TECHNICAL PUBLICATION no. 145. p. 76-88. 1952. American Society for Testing Materials, Philadelphia. (TA410 Am35Sn)

Results of tests on large forgings, steel castings, and weld seams. Diagrams, photographs, tables.

10293 Non-Destructive Electronic Sorting of Metals for Physical Properties. Fritz Förster. Paper from SYMPOSIUM ON NON-DESTRUCTIVE TESTING. ASTM SPECIAL TECHNICAL PUBLICATION no. 145, p. 89-98. 1952. American Society for Testing Materials, Philadelphia. (TA410 Am35Sn)

Operation of instruments which eliminate effect of dimensional fluctuations almost completely. Graphs, photograph, diagrams.

See also:
9475 (non-destructive testing of electrical cables)
10307 (scintillation counting in non-destructive testing)

NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION

10294* Nuclear Reactors and Power Production. I. Christopher Hinton. *Atomics (British)*, v. 5, Apr. 1954, p. 115-123.

Design and construction of nuclear reactors, particularly types suitable for generation of power. Diagrams, photographs. (To be continued.)

10295 Fast Negative Hydrogen Ions. A. Charles Whittier. *Canadian Journal of Physics*, v. 32, Apr. 1954, p. 275-290.

Proton beam was directed through H gas at low pressure. Magnetic analysis of emergent beam showed appreciable fraction of beam transformed into negative H ions. Diagrams, graphs, table. 17 ref.

10296* The Utilization of Radioactivity in the Age Determination of Minerals. Charles Asgian. *Canadian Mining Journal*, v. 75, Mar. 1954, p. 57-61.

Clear and concise exposition of ways in which constancies of radioactive processes are put to use in determination of geologic time. Tables, diagrams. 13 ref.

10297 Inside Three Atomic Factories. *Chemical Engineering*, v. 61, Apr. 1954, p. 130, 132, 134, 136.

Britain's atomic energy program. Production of U and Pu. Photographs.

10298* Scattering of Neutrons With Energies of Several Degrees in Liquid Helium II. (Russian.) I. M. Khalatnikov and V. N. Zharkov. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 799-802.

Investigates above problem in order to study scattering of neutrons by rotons and to calculate the scattering of neutrons connected with the emission and absorption of only a phonon. Table. 2 ref.

10299 Nuclear Power Plants for Ship Propulsion. F. E. Crever and T. Trocki. *Electrical Engineering*, v. 73, Apr. 1954, p. 331-335.

Fundamentals of thermal, intermediate, and gas-cooled reactor power plants for submarines. Diagram, graphs, tables. 4 ref.

10300* Nuclear Reactors and Power Production. Christopher Hinton. *Engineering*, v. 177, Mar. 5, 1954, p. 313-315.

Includes photograph, diagrams.

10301 Response of a Pulsed Geiger Tube. Herbert B. Rosenstock. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 275-282.

Suggests voltage applied to electrodes be periodically repeated pulse rather than usual d.c. Graphs. 9 ref.

10302* Nuclear Magnetic and Quadripolar Resonance. (French.) P. Grivet, R. Gabillard, Y. Ayant, and A. Bassompierre. *Journal de chimie physique*, v. 51, no. 1, Jan. 1954, p. 89-103; disc., p. 103.

Principle and fields of application. Experimental apparatus. Diagrams, graphs. 71 ref.

10303* Alpha Magnetic Spectrum of Thorium C and Thorium C'. (French.) A. Rytz. *Journal des recherches du centre national de la recherche scientifique*, 1953, no. 25, Dec., p. 254-256.

Confirms existence of α_5 in α-spectrum of Th-C. Energies and intensities of all α-groups of Th-B and -C. Table, diagrams. 9 ref.

10304 The Interaction of Neutrons With Matter Studied With a Pulsed Neutron Source. (English.) G. F. von Dardel. *Kungl. Tekniska Högskolans Handlingar* (Transactions of the Royal Institute of Technology, Stockholm, Sweden), 1954, no. 75, 102 p. (T4 K96t)

Methods of measurement and problems to which new technique can be applied. Tables, graphs, photographs, diagram. 55 ref.

10305 Two-Nucleon Nuclear Transitions. L. A. Sliv and L. K. Peker. *National Science Foundation Translation, no. 188*, Jan. 1954, 3 p. (From *Doklady Akademii Nauk SSSR*, v 92, 1953, p. 277-279.)

Studies published during the past year on decay schemes of certain nuclei now make possible a more detailed investigation of structure of a mixed system of levels. Diagrams, 6 ref.

10306 On the Quantum Theory of Wave Fields. B. T. Geilikman. *National Science Foundation Translation, no. 190*, Feb. 1954, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 90, 1953, p. 359-362.)

Considers a meson field interacting with heavy particles. 4 ref.

10307 Scintillation Counting Today. I. Phosphors and Photomultipliers. II. General Applications. III. High Energy and Cosmic Rays. IV. Spectrometry. *Nucleonics*, v. 12, Mar. 1954, p. 13-56.

Includes "Recent Advances in Theory of Scintillation Phosphors", Robert K. Swank; "New Photomultipliers and Operating Data", Bernard R. Linden; "Slow Component in Decay

of Fluors", F. B. Harrison; "Other Developments"; "Aerial Prospecting With Scintillation Counters", G. Cowper; "Large Scintillators, Cerenkov Counters for High Energies", Asher Kantz and Robert Hofstadter; "Large-Volume Liquid Scintillators; Their Applications", F. B. Harrison, C. L. Cowan, Jr., and F. Reines; and "Total-Absorption X-Ray Spectrometry: Application to Betatron Experiments", H. W. Koch and R. S. Foote. Graphs, photographs, diagrams, tables, oscillograms. 42 ref.

10308 Research Reactors. What You Need to Know to Build One. *Nucleonics*, v. 12, Apr. 1954, p. 7-19.

Includes "AEC Policy", Thomas H. Johnson; "What the Contract With AEC Calls for", Herman M. Roth; "What a Reactor Can Be Used for"; "Technical and Cost Data for Reactor Design", J. A. Lane; "Secrecy", J. G. Beckerley; and "Safety Problems", C. Rogers McCullough.

10309 Energy Spectrum Resulting From Electron Slowing Down. L. V. Spencer and U. Fano. *Physical Review*, v. 93, ser. 2, Mar. 15, 1954, p. 1172-1181.

Equation is cast in form suitable for numerical calculations. Pilot calculations were performed for source energies of $4mc^2$ and $80mc^2$ in Al and Pb. Graphs, tables. 12 ref.

10310 Absorption Cross Sections for 134 MeV Protons. J. M. Cassels and J. D. Lawson. *Physical Society, Proceedings*, v. 67, no. 410A, Feb. 1954, p. 125-133.

Absorption cross sections of C, Al, Cu, Cd, and Pb measured by transmission method. Graphs, table, diagram. 30 ref.

10311 The Scattering of Slow Neutrons by Ferromagnetic Crystals. G. L. Squires. *Physical Society, Proceedings*, v. 67, no. 411A, Mar. 1954, p. 248-253.

Beam of filtered neutrons with wave length of 7.0A. was used to measure total cross section of Ni and Fe as a function of temperature from 290 to 1170 K. Graphs, diagram. 12 ref.

10312 The Pressure of Radiation in a Refracting Medium. R. V. Jones and J. C. S. Richards. *Royal Society, Proceedings*, v. 221, ser. A, Feb. 9, 1954, p. 480-498.

Theoretical prediction that mechanical forces, exerted by light on an opaque body, are proportional to refractive index of medium in which the body is immersed. Table, oscillograms, diagrams. 30 ref.

10313* Industrial Use of Atomic Fuel. (Italian.) Bernardo Nestore Cacciapuoti. *Tecnica Italiana*, v. 9, no. 1, Feb. 1954, p. 15-19.

Features of experimental nuclear power plants in operation or under construction.

Books and Miscellaneous Publications

10314 Scintillation Counters. J. B. Birks. Pergamon Science Series. Electronics and Waves. 148 p. 1953. McGraw-Hill. (QC787.C6 B53s)

Principles; photo-multiplier tubes; pulse height and time resolution; phosphors; and applications.

10315* Research and Training Facilities for Radiobiology and for Use of Isotopes in Biology and Medicine in the United States and Canada. D. Harold Copp. 151 p. 1950. National Research Council, Washington. (QC788 C79r)

Lists facilities, personnel, and experience of 140 laboratories in colleges, hospitals, and research institutions.

10316 Nuclear Physics. W. Heisenberg. 225 p. 1953. Philosophical Library, New York. (QC173 H36n)

Atomic theory, from antiquity to the end of the 19th century; molecules and atoms; radioactivity and the building blocks of the nucleus; normal states of atomic nuclei; nuclear forces and reactions; tools of nuclear physics; and practical applications of nuclear physics.

10317 The Actinide Elements. Glenn T. Seaborg and Joseph J. Katz, editors. National Nuclear Energy Series IV-14A. 870 p. 1953. McGraw-Hill (QD172.T7 Se11a)

Chemistry and nuclear properties of Ac, U, Pa, Th, Pu, Np, Am, Cm, and their isotopes.

See also:
9278 (tagged materials in chromotography)
9593 (computer for particle accelerators)
9618 (electronic power for a synchrocyclotron)
9655 (sterilization by radiation)
9659 (X-ray sterilization)
9712 (nuclear geochemistry)
9715 (natural distribution of tritium)
9771 (radiation for mold prevention)
9883 (tracer techniques)
10424 (radiation changes in plastics)

OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING

10318 Psychological Barriers in Research. Dwight J. Ingle. *American Scientist*, v. 42, Apr. 1954, p. 283-293.

Some facts and opinions relative to man as an investigator and as a subject in research, especially in biology and medicine. 17 ref.

10319 Operations Research. Philip M. Morse. *Applied Mechanics Reviews*, v. 7, Mar. 1954, p. 89-93.

Progress report on a relatively new branch of applied science.

10320 Sampling and Paintbrushes. M. J. Snyder, L. L. Lortscher, and G. H. Beatty. *ASTM Bulletin*, 1954, no. 197, p. 49-51.

Method for sampling paint-brush fibers. Studies of samples support the assumption that random samples are obtained. Tables, graphs. 1 ref.

10321 Why Use Pneumatic Conveyors? Wilbur G. Hudson. *Chemical Engineering*, v. 61, Apr. 1954, p. 191-194.

Pneumatic conveyors are versatile, safe, convenient, dustless, and often lower in capital cost than other types. Higher power cost may be of secondary importance. Diagrams, photographs, tables.

10322 Conveyors & Elevators. Harry L. Strube. *Chemical Engineering*, v. 61, Apr. 1954, p. 195-210.

Equipment, applications, and operating characteristics. Photographs, tables, diagrams, charts.

10323 Rights and Responsibilities in the Search for Knowledge. Louis P. Hammett. *Chemical and Engineering News*, v. 32, Apr. 12, 1954, p. 1462-1465.

A human right is a privilege man retains only if he accepts the responsibility of protecting it. Man's right to the search for knowledge is no exception. A great responsibility to defend this right lies on all of us.

10324 Statistical Methods for Evaluation of Several Sets of Constants and Several Sources of Variability. Henry Scheffé. *Chemical Engineering Progress*, v. 50, Apr. 1954, p. 200-205.

Includes tables. 3 ref.

10325 Foundry Research in England. William S. Pellini. *Foundry*, v. 82, Mar. 1954, p. 112-113, 296-302.

Organizational setup and types of work pursued. Photographs.

10326 Planned Safety Reduces Press Accidents. C. E. Meldrum. *Iron Age*, v. 173, Apr. 1, 1954, p. 134-137.

Better press methods and improved safety devices sharply reduce accidents. Photographs.

10327 Progress Through Chemistry. Clyde Williams. *Monthly Business Review*, v. 36, Mar. 1954, p. 8.

Advances in technology through research in chemistry.

10328* Operational Research. Its Application to the Oil Industry. D. C. Lennon. *Petroleum*, v. 17, Apr. 1954, p. 130-133.

Special mathematical techniques permit the solution of problems previously solved only by human experience. Charts. 7 ref.

Operations Research and Management Engineering

10329 Statistics for Everyday Use. C. T. Shewell. *Petroleum Processing*, v. 9, Apr. 1954, p. 524-528.

Techniques for applying this useful mathematical tool in the plant, pilot plant, or laboratory. Table.

10330* New Materials Developments. Julius J. Harwood. *Research Reviews, Office of Naval Research*, Mar. 1954, p. 7-14.

Attention on direction in which materials research and development programs are heading; some recent accomplishments; and potential fields of application. Table, photographs.

10331* Scientific Research and National Security. Alan T. Waterman, J. Carlton Ward, Jr., and Mervin J. Kelly. *Scientific Monthly*, v. 78, Apr. 1954, p. 214-224.

Role of government in basic research, scientific research, and national economic potential; and contribution of industrial research to national security. Charts.

10332* Process Analysis by Control Charts. Martin H. Saltz. *Tool Engineer*, v. 32, Mar. 1954, p. 66-71.

Reviews development, interpretation, and limitations of quality-control charts. Discusses statistical upper and lower tolerance limits. Graphs, charts, tables.

10333 A Statistical Approach to Production and Design Problems. A. G. Thompson. *Welding and Metal Fabrication*, v. 22, Apr. 1954, p. 131-138.

Heavy metal fabrication. Two methods based on establishing relationships between time and as few process variables as will yield desired degree of accuracy. Tables, graphs, diagrams.

10334* Management Problems and How They're Solved. Edgar Kraus. *World Oil*, v. 138, Mar. 1954, p. 72, 74, 77. 2 ref.

Books and Miscellaneous Publications

10335 Design for Decision. Irwin D. J. Bross. 276 p. 1953. The MacMillan Co., New York. (BF463 B79d)

Statistical techniques of prediction, sampling, and measurement.

10336 Engineering Statistics and Quality Control. Irving W. Burr. 442 p. 1953. McGraw-Hill. (TS155 B94e)

Applications of statistical methods in various industrial operations.

10337 Industrial Specifications. E. H. MacNiece. 158 p. 1953. John Wiley & Sons, Inc. (TA180 M23i)

Specifications for raw materials, processes, and finished products; tolerances; governmental and institutional specifications; standard procedures and job specifications. Applications to paint, textiles, plastics, rubber, and metals.

10338 Comparison Radiographs of Welds. Alexander Gobus and Noah A. Kahn. Paper from SYMPOSIUM ON NON-DESTRUCTIVE TESTING. ASTM SPECIAL TECHNICAL PUBLICATION no. 145. p. 3-8. 1952. American Society for Testing Materials, Philadelphia. (TA410 Am35Sn)

Preparation of standard radiographs showing discontinuities usually found in production arc welds in steel. Photograph, radiographs.

See also:
10342a (ore dressing research)

ORE AND MATERIALS BENEFICIATION

10338a American Institute of Mining and Metallurgical Engineers, Proceedings, (Annual Volume), v. 12, 1953. 335 p. American Institute of Mining and Metallurgical Engineers, Inc., New York.

Covers agglomeration and benefication of iron ores; coal carbonization; blast furnace operatjon and blowing-in practice.

10339 Agglomeration and Beneficiation. *American Institute of Mining and Metallurgical Engineers, Proceedings*, v. 12, 1953, p. 1-103.

Includes "Beneficiation of East Texas Iron Ores", W. R. Bond; "Quality Control of Blast Furnace Flue-Dust Sinter", E. C. Rudolphy and D. J. Carney; "Reduction-Oxidation Process for the Treatment of Taconites", F. M. Stephens, Jr., Benny Langston, and A. C. Richardson; and "Sintering Fans—Construction and Application", H. R. Phelps.

10340* Recovery of Uranium From Canadian Ores. A. Thunaes. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 503, Mar. 1954, p. 128-131; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 57, 1954, p. 60-63.

Extraction, treatment methods, and influence of mineralogy. Table.

10341* Fine Grinding With Screened Ore at Lake Shore Mines. Bunting S. Crocker. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 503, Mar. 1954, p. 183-196; *Canadian Institute of Mining and Metallurgy*, v. 57, 1954, p. 115-128.

Development of process, equipment, operating procedures, and testing methods. Photographs, diagrams, tables.

10342 How to Control Heat for Calciners. Wolf G. Bauer. *Chemical Engineering*, v. 61, May 1954, p. 193-200.

Practical considerations for effective utilization of heat for calcining minerals. Photographs, diagrams.

10342a* Ore Dressing Research in India-1953. *Chemical & Process Engineering*, v. 35, Apr. 1954, p. 113-114.

Equipment and techniques in present use. Tables. 11 ref.

10343* Froth Flotation of Low-Rank Coals. J. A. E. Allum and P. F. Whelan. *Institute of Fuel, Journal*, v. 27, Mar. 1954, p. 142-147.

Two-stage conditioning scheme reduces reagent cost by 50% or more to a level which may permit economical cleaning. Tables, graphs. 4 ref.

10344 Preparation of Ores. III. Theory of Sintering and Testing of Materials. J. M. McLeod. *Iron & Steel*, v. 27, Apr. 1954, p. 145-151.

Critical review of published literature. 61 ref.

10345 Progress in Sintering. Quality of Iron Ore Sinter as Related to Moisture and Coke Content. H. A. Morrissey and R. E. Powers. *Journal of Metals*, v. 6, Apr. 1954, p. 447-449.

Abstracted from paper presented at AIME Blast Furnace, Coke Oven and Raw Materials Committee Meeting, Chicago, Apr. 1954. Clarifies problems faced by sinter plant operator in attempts to produce a strong, dense, readily reducible blast furnace material. Diagram, tables.

10346 Upgrading Manganese Ores. Three Kids Mine, Nevada. S. J. McCarroll. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Mar. 1954, p. 289-293.

Equipment, plant layout, and processes. Photographs, tables, diagram. 6 ref.

10347 Effects of Oxidation of Coals on Their Flotation Properties. Shiou-Chuan Sun. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Apr. 1954, p. 396-401.

Flotation behavior of oxidized and unoxidized coals and carbons in presence of oily collectors. Reagents effective in flotation of oxidized coals and carbons. Graphs, tables. 22 ref.

10348 Solid State Bonding in Iron Ore Pellets. Strathmore R. B. Cooke and Robert E. Brandt. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Apr. 1954, p. 411-415.

Study of solid state reactions responsible for development of hard shell in conventionally fired magnetite pellets and high strength and uniform internal structure in laboratory pellets pre-oxidized before final firing. Photographs, micrographs, table, graph. 4 ref.

10349 Flotation of Oxidized Zinc Ores. M. Rey, G. Sitia, P. Raffinot, and V. Formanek. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Apr. 1954, p. 416-420.

Fatty amines efficient for partially oxidized sulfide ores. Tables, graphs, diagram. 12 ref.

10350* Homestake Rebuilds South Mill to Save Manpower and Horsepower. Nathaniel Herz. *Mining World*, v. 16, Apr. 1954, p. 40-43, 63.

Development of ore grinding by the Homestake Mining Company, Lead, South Dakota, from 1878 to present. Photographs.

10351* The Current Status of Cyclones as a New Classification Tool. A. J. Fischer and R. D. Forger. *Mining World*, v. 16, Apr. 1954, p. 44-47, 65.

Design and operational variables and classification cost comparisons. Photographs, tables.

10352 Raw Materials for Aluminum Production. D. D. Blue. *U. S. Bureau of Mines, Information Circular* 7675, Mar. 1954, 11 p. (TN21 Un3r)

Alumina extraction and reduction processes. Tables.

10353 Concentration of Oxide Manganese Ores From Northeastern Nevada (Caviglia-Vietti, Berning, and Reed-Parker Deposits). G. M. Potter and R. R. Wells. *U. S. Bureau of Mines, Report of Investigations* 5023, Feb. 1954, 13 p. (TN21 Un3r)

Laboratory tests determine amenability to methods of concentration. Tables.

10354 Beneficiatin of Oxide Manganese and Manganese-Silver Ores From Southern Arizona. R. Havens, S. J. Hussey, J. A. McAllister, and K. C. Dean. *U. S. Bureau of Mines, Report of Investigations* 5024, Feb. 1954, 30 p. (TN21 Un3r)

Studies determine amenability to concentration. Tables.

10355* Metallurgical Problems of Alumina Production. (German.) Hans Ginsberg. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 7, no. 3, Mar. 1954, p. 93-98; disc., p. 98-99.

Problems of extracting by Bayer process. Effectiveness of 15 substances as inoculants. Metallographic and X-ray structure of bauxites. Tables, graphs, photographs, micrographs. 2 ref.

10356* Step-Like Nature of Thermal Dissociation Process of Siderites. (Russian.) V. I. Kaurkovskii. *Zhurnal Prikladnoi Khimii*, v. 27, no. 2, Feb. 1954, p. 136-141.

Importance in crystalline structures. Nature of breaks in thermographs. Graphs, table, diagram, micrographs. 5 ref.

See also:
9217 (ultrasonics in ore dressing)

PHYSICS

10357 On Nonspecular Reflection at a Rough Surface. John W. Miles. *Acoustical Society of America, Journal*, v. 26, Mar. 1954, p. 191-199.

Reflection of plane wave at rough interface separating two fluid media. Exact solutions obtained when roughness is harmonic. Asymptotic results obtained for arbitrary distributions. Graphs. 26 ref.

10358 Simplified Numerical Integration. C. L. Shue. *Aircraft-Engineering*, v. 26, Mar. 1954, p. 89-94, 96.

Successive approximation difference-table method for solution of differential equations. Diagrams, tables.

10359* Heat Transfer by Free Convection in an Open Thermosyphon Tube. B. W. Martin and H. Cohen. *British Journal of Applied Physics*, v. 5, Mar. 1954, p. 91-95.

Glycerine, water, and air used to investigate heated vertical tube closed at its lower end. Tables, diagram, graphs. 6 ref.

10360 Induced Infrared Absorption in Hydrogen and Hydrogen-Foreign Gas Mixtures at Pressures up to 1500 Atmospheres. D. A. Chisholm and H. L. Welsh. *Canadian Journal of Physics*, v. 32, Apr. 1954, p. 291-312.

Investigates H-He, H-N, and H-A mixtures at temperatures of 80 to 376 K. Tables, graphs, diagrams. 22 ref.

10361* Electric Conductivity of Shock and Detonation Waves and Measuring the Speed of the Waves. (French.) Meir Birk, Avner Erez, Yaakov Manheimer, and Gavriel Nahmani. *Comptes rendus*, v. 238, no. 6, Feb. 8, 1954, p. 654-655.

Role of electrode surfaces and shock wave intensity. Oscillogram, graph. 4 ref.

10362* Temperature Course of Curves of Magnetization of Nickel-Zinc Ferrites in Low Fields. (Russian.) A. P. Komar and N. M. Reinov. *Doklady Akademii Nauk SSSR*, v. 93 no. 1, Nov. 1, 1953, p. 19-20.

Curves for different temperatures down to that of liquid He at field strengths up to 600 oersteds. Graph. 2 ref.

10363* Second Law Analysis. Edward A. Bruges. *Engineer*, v. 197, Mar. 5, 1954, p. 341-344.

Concepts of available and unavailable energy upon which analysis depends and evaluation of irreversibility. Tables, diagrams. 9 ref.

10364 Calculation of the Resonant Properties of Electrical Cavities. Sidney Bertram. *I.R.E., Proceedings*, v. 42, Mar. 1954, p. 579-585.

Resonant properties of axially symmetric cavities calculated using data obtained on an analogous static system in an electrolytic tank. Graphs, photograph, diagrams. 2 ref.

10365 Use of Restricted Variational Principles for the Solution of Differential Equations. Philip Rosen. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 336-338.

Nonlinear equations may be solved approximately, using variational principles. Ordinary first- and second-order equations discussed in detail. 4 ref.

10366 On a Nonlinear Diffusion Equation Applied to the Magnetization of Saturable Reactors. Shou-Hsien Chow. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 377-381.

Solution for cases of finite and infinite slabs of ferromagnetic material. Graphs. 2 ref.

10367 The Velocity of Sound in Water as a Function of Temperature and Pressure. A. H. Smith and A. W. Lawson. *Journal of Chemical Physics*, v. 22, Mar. 1954, p. 351-359.

Velocity of sound measured by ultrasonic echo technique in temperature range −12 to 129 C under hydrostatic pressures up to 9600 kg. per cm^2. Diagrams, tables, graphs. 24 ref.

10368 The Elementary Basic Principles of the Unified Theory of Relativity C_2. I. Applications. Václav Hlavatý. *Journal of Rational Mechanics and Analysis*, v. 3, Mar. 1954, p. 147-179.

Physical applications of unified theory of relativity as proposed by Einstein. 6 ref.

10369 On the Origin of the Various Emission Bands of CaSBi Phosphors. V. F. Tunitskaya. *National Science Foundation Translation*, no. 105, Oct. 1953, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 91, 1953, p. 507-510.)

Determination of Bi bands and conditions for their appearance. Graphs, photographs. 7 ref.

10370 On the Effect of the Hydrogen Bond on Raman Spectrum. A. I. Stekhanov. *National Science Foundation Translation, no.* 189, Feb. 1954, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 92, 1953, p. 281-284.)

Numerous studies show that in the Raman spectra of gases in the region 3650 cm^{-1}, a narrow line is observed which corresponds to the valence vibration of the OH group. Table, graphs. 9 ref.

10371* Determination of Absorption Coefficients of Ultrasonic Waves in Liquids by the Thermal Method. (Italian.) E. Grossetti. *Nuovo cimento*, v. 11, ser. 9, no. 3, Mar. 1, 1954, p. 250-254.

Measurements in water, glycerin, vaseline oil, and amyl alcohol. Diagram, tables, graphs.

10372 Microwave Resonance Absorption in Nickel Ferrite-Aluminate. Thomas R. McGuire. *Physical Review*, v. 93, ser. 2, Feb. 15, 1954, p. 682-686.

Experimental results of magnetic resonance with attention to region of Al content where magnetic moment approaches zero. Graphs. 15 ref.

Physics

10373 Infrared Optical Properties of Single Crystals of Tellurium. Joseph J. Loferski. *Physical Review*, v. 93, ser. 2, Feb. 15, 1954, p. 707-716.

Fundamental optical absorption and photoconductivity was investigated. Crystals exhibit dichroism in infrared. Photoconductivity is considerably enhanced by reduction of temperature to 90 K. Graphs, tables, diagrams. 28 ref.

10374 Infrared Absorption, Photoconductivity, and Impurity States in Germanium. W. Kaiser and H. Y. Fan. *Physical Review*, v. 93, ser. 2, Mar. 1, 1954, p. 977-980.

Measurements for *p*-type Ge with Au and Cu impurities conducted at different temperatures. Graphs, table. 8 ref.

10375 Electrical Properties of α-Fe_2O_3. F. J. Morin. *Physical Review*, v. 93, ser. 2, Mar. 15, 1954, p. 1195-1199.

Conductivity, Seebeck effect, and optical transmission of α-Fe_2O_3 were analyzed using two models. Graphs, table. 4 ref.

10376 Electrical Properties of NiO. F. J. Morin. *Physical Review*, v. 93, ser. 2, Mar. 15, 1954, p. 1199-1204.

Polycrystalline samples investigated for conductivity, Seebeck effect, and optical transmission. Graphs, table. 5 ref.

10376a Coherent Systems of Physical Units. Dudley Williams. *Physics Today*, v. 7, Apr. 1954, p. 8-11.

Review of questions concerning need for consistency in deriving convenient systems of physical units. Tables.

10377 Paramagnetic Resonance Spectra of Some Ferric Alums, and the Nuclear Magnetic Moment of ^{57}Fe. B. Bleaney and R. S. Trenam. *Royal Society, Proceedings*, v. 223, ser. A, Apr. 7, 1954, p. 1-14.

Spectra of ferric rubidium sulfate and ferric K selenate alums (diluted with corresponding aluminum alums) were analyzed in detail. Tables, graphs, spectrogram. 20 ref.

10378 Ultrasonics. George E. Henry. *Scientific American*, v. 190, May 1954, p. 55-63.

General discussion; typical applications. Photographs, diagrams.

10379 Quantum Mechanics and the Aether. P. A. M. Dirac. *Scientific Monthly*, v. 78, Mar. 1954, p. 142-146.

Non-mathematical discussion.

10380 It's Time to Give Noise a Hearing. Harry Chandler. *Steel*, v. 134, Mar. 1, 1954, p. 94-96.

Factory din leads to hearing loss claims by employees. Immediate problem is to dampen noises influencing day-to-day productive output. Photographs.

10381 On the Sound Field of a Point-Shaped Sound Source in Uniform Translatory Motion. H. Hönl. *U. S. National Advisory Committee for Aeronautics, Technical Memorandum* 1362, Apr. 1954, 44 p. (TL570 Un3tm)

Adopts direct method of solution using Fourier integral. Diagrams. 7 ref.

Books and Miscellaneous Publications

10382 Mathematical Structure of the Theories of Viscoelasticity. Bernhard Gross. 74 p. 1953. Herman & Cie, Paris. (QC189 G91m)

A phenomenological theory of viscoelastic behavior based on concept of distribution functions. Analogies of viscoelastic and dielectric behavior, linear network theory, magnetic after effect, and linear integral equations.

10383 Visual Lines for Spectroscopic Analysis. D. M. Smith. 2nd Rev. Ed. 102 p. 1952. Hilger & Watts, Ltd., London. (QC451 Sm54v2)

Wave length spectrometer and accessories; arc excitation sources; use of the carbon arc; wave length tables for use in analysis; and spectroscopic identification of metallic constituents of glass.

10384 Low Temperature Physics. Charles F. Squire. International Series in Pure and Applied Physics. 244 p. 1953. McGraw-Hill. (QC278 Sq58L)

Gas liquefaction and equation of state; liquid He; superconductivity, magnetism, and dielectric properties.

10385 Heat Transfer. Research Studies for 1954. F. J. Van Antwerpen, editor. Chemical Engineering Progress Symposium Series, no. 9. 67 p. 1954. Amer. Inst. of Chem. Engr., N. Y. (QC320 Am35he)

Includes "Bed-Wall Heat Transfer in Fluidized Systems", Octave Levenspiel and J. S. Walton; "Heat Transfer by Free Convection Through Liquids Between Two Horizontal Surfaces", Max Jacob and Pitam C. Gupta; "Heat-Transfer Coefficients for Gases. Effect of Temperature Level and Radiation", H. J. Ramey, J. B. Henderson, and J. M. Smith; "Heat-Transfer Properties of Liquid-Solid Suspensions", Clyde Orr, Jr. and J. M. DallaValle; "Pressure Drop and Heat Transfer for Two-Phase, Two-Component Flow", Lawrence Fried; "Some Problems in the Design of Light-Hydrocarbon Pyrolysis Coils", P. H. Calderbank; and "Critical Analysis of Metal Wetting and Gas Entrainment in Heat Transfer to Molten Metals", W. C. Macdonald and R. C. Quittenton.

See also:
9638 (thermal convection)
10032 (spectroscopy of various metals)
10042 (Saint-Venant's principle)

PLASTICS

10386 Laminated Glass Fiber Plastic Tooling Cuts Lead Time Up to 50 Per Cent. Thomas MacNew. *Automotive Industries*, v. 110, Mar. 1, 1954, p. 46-48, 82.

Jigs, fixtures, and dies as used for manufacture of aricraft components. Photographs, diagrams.

10387 Speed and Simplicity. *Bakelite Review*, v. 26, Apr. 1954, p. 20-21.

Spray-on dressing cuts bandaging time as much as 90%. Does away with usual bulky gauze and adhesive bandages. Photographs.

10388 Pressure Effects During the Injection Moulding of Polystyrene. S. D. Eagleton. *British Plastics*, v. 27, Mar. 1954, p. 95-99.

Effect of lubricants on pressure loss in solid zone of injection molding machine and of pressure on temperature of the polymer. Consequences of pin-point gating and increases in internal strains of moldings as pressure is increased. Diagrams, graphs, table, photographs.

10389 Alkyd Moulding Materials. C. A. Redfarn. *British Plastics*, v. 27, Apr. 1954, p. 131-133.

Composition of materials, molding techniques employed, properties of moldings, and applications.

10390 Recent Advances in the Structure of Phenoplasts. R. F. Hunter. *Chemistry & Industry*, 1954, no. 10, Mar. 6, p. 262-265.

12 ref.

10391* Polymerization of Ortho-Vinyldiphenyl. (Russian.) M. M. Koton. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 825-826.

Polymerization without a catalyst at temperatures of 100, 110, and 125 C. Simultaneous investigation of styrene under the same conditions to determine the influence of the diphenyl radical on polymerization of the vinyl group. Table, graph. 5 ref.

10392 Epoxy Resins. R. A. Johnson. *Electronic Engineering*, v. 26, Apr. 1954, p. 136-142.

Methods of use and properties of casting resins. New developments which are taking place with these materials. Tables, photographs.

10393* The Synthesis of Block Copolymers of Styrene and Methyl Methacrylate. A. S. Dunn, B. D. Stead, and H.

W. Melville. *Faraday Society, Transactions*, v. 50, Mar. 1954, p. 279-290.
Preparation by addition polymerization. Methods used to isolate copolymer. Spectrograms, graphs, tables. 26 ref.

10394 Effect of Ultrasound on Thermoplastic Melts. Ernest C. Bernhardt. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 742-746.
Molecular orientation, pigment dispersion, and viscosity of polymer melts. Diagrams, tables, photograph, micrographs. 13 ref.

10395 How Plastics Cut Short Run Tooling Costs. Arthur A. Merry. *Iron Age*, v. 173, Mar. 4, 1954, p. 158-161.
Cast plastics used to advantage in making intricately contoured dies, checking fixtures, drill jigs with steel bushings, milling fixtures, baffle forms, and trimline templates. Photographs.

10396* Absorption Spectra of Polystyrene and Monostyrene at Low Temperatures. (Russian.) A. N. Nikitina. *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia*, v. 17, no. 6, 1953, p. 728-732 + 1 plate.
Investigates various materials in liquid N. Tables, spectrographs. 4 ref.

10397 Inorganic Polymerization Reactions. Earle S. Scott and L. F. Audrieth. *Journal of Chemical Education*, v. 31, Apr. 1954, p. 168-175.
Condensation polymerization in aqueous solution and under ansolvous conditions at elevated temperatures. Molecular and disproportionate polymerization. 16 ref.

10398 The Viscoelastic Properties of Plastics. F. Bueche. *Journal of Chemical Physics*, v. 22, Apr. 1954, p. 603-609.
Method predicts behavior; simplified model of molecule is assumed; and its general motion is treated by method of normal coordinates. Tables. 9 ref.

10399* The Microstructure of Diene Polymers. II. Polyisoprenes and Polybutadienes Prepared at High Pressures. III. Polyisoprenes and Polybutadienes Prepared With Cationic Catalysts. W. S. Richardson. *Journal of Polymer Science*, v. 13, Apr. 1954, p. 321-328.
Results of studies obtained from infra-red spectra. Tables, diagram. 9 ref.

10400* Self-Adhesion of High Polymers. II. Investigation of Self-Adhesion of Polyisobutylene. (Russian.) S. S. Voiutskii and V. M. Zamazii. *Kolloidnyi Zhurnal*, v. 15, no. 6, Nov.-Dec., 1953, p. 407-415.
Effect of plasticizers and fillers. Graphs, tables. 2 ref.

10401* A Simple Method of Determining the Characteristic Viscosity of Diluted High Polymer Solutions. (Russian.) E. S. Roskin. *Kolloidnyi Zhurnal*, v. 15, no. 6, Nov.-Dec. 1953, p. 455-458.
Formula facilitating analytic calculation of viscosity for two arbitrary concentrations. Tables. 5 ref.

10402* Mechanical Relaxation Phenomenon in High Polymers. (Relation to Structure.) (German.) K. Schmieder and K. Wolf. *Kolloid-Zeitschrift*, v. 134, nos. 2-3, Dec. 11, 1953, p. 149-185; disc., p. 185-189.
Experiments with fiber, molecular, branched, reticulated, amorphous, and partially crystalline substances as a function of temperature. Graphs, tables. 59 ref.

10403* The Effect of Ultrasonic Waves on Emulsion Polymerization of Vinyl-Acetate. II. Effect of Ultrasonic Waves on Colloids. (German.) Naoyasu Sata and Yukio Harisaki. *Kolloid-Zeitschrift*, v. 135, no. 3, Mar. 1954, p. 182-186.
Experiments show 10% greater effect than heat on decomposition of a catalyst and increased rate of solution of vinyl monomer. Table, graphs. 6 ref.

10404* Pneumatic Method of Accurate Thickness Measurement of Highly Elastic Plastic Films. (German.) Adolf Dittrich. *Kunststoffe*, v. 44, no. 3, Mar. 1954, p. 87-91.
Application of Solex method of measuring thickness and modulus of elasticity of viscous solid and liquid layers. Graphs, diagrams. 8 ref.

10405* Reduction of Plastics. II. (German.) Hans Rumpf. *Kunststoffe*, v. 44, no. 3, Mar. 1954, p. 93-103.
Practical details of fracture and mechanical disintegration. Diagrams, graphs, photographs, table, micrographs. 13 ref.

10406* Grinding Glass Fiber-Reinforced Plastics. R. T. Argy. *Machine and Tool Blue Book*, v. 49, Apr. 1954, p. 172 + 7 pages.
Machining and finishing with coated and bonded abrasives. Photographs.

10407* Studies on the Adsorption of Detergents and on the Electrophoretic Mobility of Emulsion Particles in the Emulsion Polymerisation of Vinyl Acetate. Seizo Okamura and Takuhiko Motoyama. *Memoirs of the Faculty of Engineering, Kyoto University*, v. 15, no. 4, Oct. 1953, p. 242-252.
Degree of adsorption per gram of polymer is found to saturate at constant value. Mobility becomes constant at higher detergent concentrations. Graphs, tables. 12 ref.

10408* Polyethylene-Coated Cellophane. Leonard F. Swec and George H. Sullivan. *Modern Packaging*, v. 27, Mar. 1954, p. 203 + 10 pages.
Best properties of two films combined in single low-cost material. Photographs, tables, diagrams.

10409* Saran Film Today. F. C. Dulmage, Jr. *Modern Packaging*, v. 27, Apr. 1954, p. 117-121.
A review. Photographs, diagrams, tables, graph. 11 ref.

10409a Futures for Plastics Pipe. *Modern Plastics*, v. 31, Mar. 1954, p. 73-81, 181-187.
Present and future applications. Photographs, tables.

10410 Cellular Polyethylene by Extrusion. W. T. Higgins. *Modern Plastics*, v. 31, Mar. 1954, p. 99-100, 102, 104.
From a paper presented at the Signal Corps Symposium at Asbury Park, N. J. Material produced by use of thermally sensitive blowing agent offers many advantages in electrical applications. Photographs, graphs, table.

10411 Irradiated Polyethylene. *Modern Plastics*, v. 31, Apr. 1954, p. 100-101, 219.
Bombarding with high energy electrons from modified X-ray equipment. Photographs, graph.

10412 Polyester-Glass Molding Compounds. Harry R. Sheppard. *Modern Plastics*, v. 31, Apr. 1954, p. 121 + 7 pages.
Factors considered in manufacturing and molding. Photographs, graphs.

10413 Shape a Sheet. *Modern Plastics*, v. 31, May 1954, p. 87 + 17 pages.
Method of vacuum forming any rigid thermoplastic. Advantages include low-cost tooling, flexibility in design, large-area pieces, and early production. Photographs, diagrams.

10414 'Popcorn' Plastic. *Modern Plastics*, v. 31, May 1954, p. 103-105, 200.
Molded polystyrene foam, produced from tiny hard beads when heated in a mold, has good thermal insulating and low water absorption properties. Photographs, table.

10415 Heat-Resistant Silicone Foams. D. E. Weyer and K. R. Hoffman. *Modern Plastics*, v. 31, May 1954, p. 133 + 4 pages.
Materials, preparation, properties, and applications. Photographs, tables, graphs.

10416 Partition Chromatography in the Examination of Natural Resins. J. S. Mills and A. E. A. Werner. *Oil & Colour Chemists' Association, Journal*, v. 37, Mar. 1954, p. 131-142.
Method used for identification of natural resins alone or when mixed with oils as in varnishes and paint media. Graphs, diagrams. 9 ref.

10417* Applications and Possibilities of Polyester Resins. (Dutch.) H. A. K. Eden. *Plastica*, v. 7, no. 3, Mar. 1954, p. 112-114.
Properties and use in Holland. Characteristics compared with those of phenol formaldehyde. Economic considerations. Tables.

Plastics

10418* Some New Plastic Raw Materials of the Badischen Anilin- and Soda-Fabrik Plant. (German.) Fritz Stastny. *Plastica*, v. 7, no. 3, Mar. 1954, p. 120-124.

Four new plastics developed from polyester resin, polystyrol, and vinylchloride. Properties and possibilities of application. Photographs, table.

10419 The Co-Polymerization of Styrene and Butyl Acrylate in Benzene Solutions. J. H. Bradbury and H. W. Melville. *Royal Society, Proceedings*, v. 222, ser. A, Mar. 23, 1954, p. 456-470.

Rate of polymerization was obtained from weight of isolated polymer. Rate of initiation by radioactive assay of initiator and polymer. Graphs, tables. 30 ref.

10420 Society of the Plastics Industry, Proceedings (Annual Volume), v. 8, 1953. Sections individually paged. Society of the Plastic Industry, Inc., Ridgewood, N. J.

Consists of 34 papers covering production, properties, and applications of reinforced plastics.

10421* Plastics Piping. B. W. Bender. *Southern Pulp and Paper Manufacturer*, v. 17, Apr. 1954, p. 51-54.

Limitations and advantages for various applications. Tables.

10422* Vinyl Paste Resins for Today and Tomorrow. W. D. Todd. *SPE Journal*, v. 10, Mar. 1954, p. 13-15, 39-40.

Paste resin dispersions, including principles and applications. Tables, graphs, diagrams, photograph. 8 ref.

10423* The Mechanical Properties of Polyethylene. Robert H. Carey. *SPE Journal*, v. 10, Mar. 1954, p. 16-21, 41-42.

Includes graphs, tables. 16 ref.

10424* Theory of the Changes in Physical Characteristics of Plastics Caused by Radiation. J. W. Ryan. *SPE Journal*, v. 10, Apr. 1954, p. 11, 41.

Effects of α-, β-, and γ-ray generators. 15 ref.

10425* The Crazing of Polystyrene. E. E. Ziegler. *SPE Journal*, v. 10, Apr. 1954, p. 12 + 10 pages.

Manner in which crazing is affected by time, temperature, reagents, and exposures. Tables, graphs. 12 ref.

10426* The Extrusion of Film and Sheeting. George D. Kovach. *SPE Journal*, v. 10, Apr. 1954, p. 24-27.

Equipment and performance characteristics. Photographs, table.

10427* Electron Diffraction Studies of Crystalline Polymers. II. Polyvinlidene Chloride and Its Series of Copolymers. (Russian.) V. A. Kargin and G. S. Markova. *Zhurnal Fizicheskoi Khimii*, v. 27, no. 10, Oct. 1953, p. 1525-1529.

Independence of interference pictures of chain order and parameters show distinction of polymer crystals. Table. 7 ref.

Books and Miscellaneous Publications

10428 Fibres From Synthetic Polymers. Rowland Hill, editor. Elsevier's Polymer Series. 554 p. 1953. Elsevier Publishing Co., Amsterdam. (TS1548 H55f)

Includes "Kinetics of Polymerisation Reactions", H. W. Melville; "Energetics of Polymerisation Reactions", M. G. Evans; "Fibre-Forming Vinyl Polymers: Preparation", R. B. Richards, L. B. Morgan, and I. Harris; "Principles of Polycondensation", R. J. W. Reynolds; "Polyamides, Polyesters and Polyurethanes", R. J. W. Reynolds; "Some Miscellaneous Fibre-Forming Condensation Polymers", R. J. W. Reynolds; "Molecular Weight and Molecular Weight Distribution", F. D. Hartley;; "Molecular Structure", C. W. Bunn; "Polymer Texture", C. W. Bunn; "Structure of Crystalline Regions", C. W. Bunn; "Melting and Second Order Transition Phenomena", C. W. Bunn; "Solubility", E. E. Walker; "Fibres by Melt Extrusion", R. M. Lodge; "Fibres by Wet Spinning Process", J. M. Preston; "Fibres by Dry Spinning Processes", W. Frey and A. Sippel; "Polyamide Fibres", A. R. Munden; "Polyester Fibres", I. Marshall and J. R. Whinfield; "Vinyl and Acrylic Fibres", G. H. Fremon; and "The Dyeing of Synthetic Fibres", T. Vickerstaff.

See also:
9135 (plastics in horticulture)
9322 (epoxidation-hydroxylation reactions)
9384 (epoxy resins for coatings and cements)
9407 (polyamides for coatings)
9735 (reinforced-plastic compressor blade)
9865 (plastics for high temperature use)
9875a (plastics for tools and dies)

POLLUTION AND WASTES

10429* Centrifugal Dust Separation. W. Muhlrad. *Chaleur & Industrie*, v. 35, no. 343, Feb. 1954, p. 41-58.

Various theoretical considerations. Characteristics and differences between cyclone and multitubular apparatus. Tables, drawings, graphs. 6 ref.

10430 Smog Scramble Spans Nation. *Chemical and Engineering News*, v. 32, Mar. 1954, p. 1108-1113.

Scientists pinned down specific causes and in some cases achieve high rate of control. Photographs.

10431* Fly Ash. Asset or Liability? J. R. Wilde and V. A. Stace. *Electrical World*, v. 141, Apr. 12, 1954, p. 42-43, 47.

Efforts of one plant to make ash disposal pay for itself. Photographs, table.

10432 Efficiency Studies of Three Wet-Type Dust Collectors. Bernard D. Bloomfield. *Heating and Ventilating*, v. 51, Apr. 1954, p. 89-93.

Results of experimental studies. Tables, photographs, drawings.

10433 New System Cuts Waste Pickle Liquor Disposal Costs. D. A. Dahlstrom. *Iron Age*, v. 173, Apr. 8, 1954, p. 150-153.

Design, operating procedures, and advantages. Photographs, diagram, graph, table.

10434* Clarifying Waste Water From Concentration Plants by Flocculation With Glue. (Swedish.) Valter Öhman. *Jernkontorets Annaler*, v. 138, no. 2, 1954, p. 97-112.

Depends on quality of glue and dispersion of electrical charges effected by adding electrolytes. Method in Swedish plants showed good results. Graphs. 5 ref.

10435 How Oil Industry Fights Smear of Its Good Name. *National Petroleum News*, v. 46, Mar. 24, 1954, p. 18-21.

Refiners answers to accusations that hydrocarbons released into air by oil refineries, storage tanks, and stations are main cause of smog. Photographs.

10436* Disposal of Steel Production Wastes at the Fairless Works. G. A. Howell. *Sewage and Industrial Wastes*, v. 26, Mar. 1954, p. 286-297; disc., p. 297-299.

Waste waters containing mill scale, acids, flue dust, and concentrations of oils and greases treated close to their sources. Photographs, diagrams.

10437* Directions for Determining Granulation Curves of Dust by Andreasen Sedimentation Analysis. (German.) Ernst Joos. *Staub*, 1954, no. 35, p. 18-34.

Suggestions for improving pipette method. Possible errors in analysis of inhomogeneous dusts. Diagrams, graphs, table.

10438* Citrus Waste Treatment Studies. Ross E. McKinney, Leon Poliakoff, and Russell G. Weichlein. *Water & Sewage Works*, v. 101, Mar. 1954, p. 123-127.

Laboratory development of aerobic methods involving added N or "super-activated" sludge. Graphs, table. 5 ref.

10439* Flotation and Sedimentation in Treating Wastes. A. A. Kalinske and R. R. Evans. *Water & Sewage Works*, v. 101, Mar. 1954, p. 128-131.

A comparison of processes for removing suspended matter. Photograph, diagrams. 8 ref.

10440* Oxidation-Reduction Potential. Robert Shapiro. *Water & Sewage Works*, v. 101, Apr. 1954, p. 185-188.

Review of factors involved in application to operation of sewage treatment processes. Photograph, diagram. 11 ref.

Books and Miscellaneous Publications

10441 Disposal of Cyanide Wastes From Plating Operations. Barnett F. Dodge, Charles A. Walker, and Walter Zabban. Paper from ELECTRODEPOSITION RESEARCH. NATIONAL BUREAU OF STANDARDS CIRCULAR 529. p. 113-119; disc., p. 119-120. 1953. U. S. Dept. of Commerce, U. S. Government Printing Office, Washington 25, D. C. (TS670 Un3.5e)

Eight methods were investigated. Graphs. 8 ref.

See also:
9256 (atmospheric pollution)
9750 (collection by fly ash)
10538 (utilization of spent sulfite liquor)

RUBBER AND ELASTOMERS

10442 CIC Reports on Trends in the Rubber Products Industry. *Chemistry in Canada*, v. 6, Mar. 1954, p. 23-33.

Includes photographs, graphs.

10443* Combined Oxidation of Rubber and Solvent in Swollen Vulcanizates. (Russian.) R. M. Belitskaia, T. G. Degteva, and A. S. Kuz'minskii. *Doklady Akademii Nauk SSSR*, v. 93, no. 1, Nov. 1, 1953, p. 81-83.

Influence of chemical nature of solvent on process of oxidation of butadiene-Na rubber and resulting vulcanizate. Graphs. 5 ref.

10444* Free Energy of Deformed Rubber. (Russian.) L. S. Priss. *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 813-816.

Expression for free energy has only one constant and is in accord with experimental data for synthetic rubbers. Graphs. 5 ref.

10445* Oxygen Absorption Versus Conventional Aging of Commercial Vulcanizates. Louis R. Pollack. *India Rubber World*, v. 130, Apr. 1954, p. 53-57.

Thirty-four commercial vulcanizates aged in the O bomb, air oven, and by an O absorption test. Tables, diagram. 12 ref.

10446 Petroleum Oil Extenders. W. L. Dunkel, F. P. Ford, and J. H. McAteer. *Industrial and Engineering Chemistry*, v. 46, Mar. 1954, p. 578-586.

Correlates properties of GR-S with chromatographic analysis. Tables, graphs, photograph. 15 ref.

10447 Oxidation of Unvulcanized Rubber. F. Lyon, K. A. Burgess, and C. W. Sweitzer. *Industrial and Engineering Chemistry*, v. 46, Mar. 1954, p. 596-600.

Effect of carbon black on autocatalytic stage of oxidation of unvulcanized rubber is specific for type of C, reaction conditions, and polymer. Graphs, tables. 11 ref.

10448 Chemical Nature of Oil Extenders for Synthetic Rubbers. F. S. Rostler and R. M. White. *Industrial and Engineering Chemistry*, v. 46, Mar. 1954, p. 610-620.

Includes diagrams, graphs, tables, photographs. 24 ref.

10449 Evaluation of Diene-Type Elastomers. R. W. Laundrie, Milton Feldon, and A. L. Rodde. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 794-803.

Oil and solvent resistance and low temperature flexibility. Tables, graphs. 12 ref.

10450 Oxidation and Antioxidant Action in Rubber Vulcanizates. J. Reid Shelton and William L. Cox. *Industrial and Engineering Chemistry*, v. 46, Apr. 1954, p. 816-823.

Mechanism of action indicates antioxidant may function in four ways, some beneficial and some harmful. Tables, graphs. 9 ref.

10451 Experimental Study of Low-Frequency Effects on the Dynamic Modulus of a Buna-N Rubber. Allen Q. Hutton and A. W. Nolle. *Journal of Applied Physics*, v. 25, Mar. 1954, p. 350-354.

Young's modulus of a vulcanized gum rubber measured at frequencies of 0.05, 0.10, and 1.00 cycles per sec., in temperature range −22 to 30 C. Graphs, diagram. 3 ref.

10452* Electrical Measurements on Rubber-Carbon Black Systems. (German.) Gotthold Kickstein. *Kautschuk und Gummi*, v. 7, no. 3, Mar. 1954, p. WT50-WT55; disc., p. WT56.

Hysteresis effect appears to be prime cause of frequency dependence of dielectric constant and loss angle in the system. Table, graphs, photographs, diagrams. 8 ref.

10453* Pneumatic Measuring and Control Instruments. (German.) R. Wannow. *Kautschuk und Gummi*, v. 7, no. 3, Mar. 1954, p. WT56-WT61; disc., p. WT61.

Instruments for rubber processing. Diagrams, graphs, photographs.

10454* Formation of Rubber Films From Solutions and Aqueous Dispersions. (Russian.) D. Sandomirskii and K. Gagina. *Kolloidnyi Zhurnal*, v. 15, no. 6, Nov.-Dec. 1953, p. 448-454.

Mechanical properties, shrinkage, and swelling in water vapors. Varied behavior depends on production method. Tables, graphs. 13 ref.

10455* The Role of Hard Rubber in the Chemical Industry. (Hungarian.) Andor Rostás. *Magyar Kémikusok Lapja*, v. 9, no. 3, Mar. 25, 1954, p. 76-80.

Physical, chemical, and mechanical properties of vulcanized rubber. Production and processing. Photographs, tables.

10456* Rubber Thermal Plastization in Live Steam. (French.) E. Stalinsky. *Revue générale du caoutchouc*, v. 31, no. 2, Feb. 1954, p. 95-99.

Resulting material is more plastic and easier handled and stored than untreated rubber. Graphs, tables, photographs, diagrams.

10457* Protection of Natural Rubber Against Atmospheric Agents. I. Effects of Nickel Dibutyldithiocarbamate and Its Association With Protective Agents. (French.) C. P. Pinazzi and M. Billuart. *Revue générale du caoutchouc*, v. 31, no. 2, Feb. 1954, p. 123-131.

Includes tables, graphs, photographs. 19 ref.

10458 The Permeability of Different Elastomers to CO_2 Using Carbon-14. A. D. Kirshenbaum, A. G. Streng, and W. B. Dunlap, Jr. *Rubber Age*, v. 74, Mar. 1954, p. 903-908.

Apparatus and techniques of accurate isotopic method. Photographs, diagrams, tables, graphs. 8 ref.

10459* Joint Influence of Sulfur (Free and Combined) and Phenol-β-Naphthylamine on Oxidation of Vulcanizates. (Russian.) A. S. Kuz'minskii and S. I. Bass. *Zhurnal Prikladnoi Khimii*, v. 27, no. 2, Feb. 1954, p. 189-197.

Inhibitive action on oxidation. Graphs. 11 ref.

10460* Solubility of Phenol-β-Naphthylamine in Rubbers. (Russian.) S. A. Reitlinger and A. S. Kuz'minskii. *Zhurnal Prikladnoi Khimii*, v. 27, no. 2, Feb. 1954, p. 214-217.

Determination in natural rubber, polybutadiene, butadiene-styrene, and butadiene-nitrile copolymers. Micrographs, table, graph. 1 ref.

See also:
9330 (chemistry of rubber)

SPACE HEATING AND CONDITIONING

10461 American Society of Heating and Ventilating Engineers, Transactions, (Annual Volume), v. 58, 1952. 416 p. American Society of Heating and Ventilating Engineers, New York.

Includes "Venting Hot Water Heating Systems", F. E. Giesecke; "Self-Charging Electrostatic Air Filters", W. T. Van Orman and H. A. Endres; "A V-Wire Direction Probe", H. B. Nottage, J. G. Slaby, and W. P. Gojsza; "Radiant Energy Emission of Atmosphere and Ground—A Design Factor in Heat Gain and Heat Loss", G. V. Parmelee and W. W. Aubele; "Isothermal Ventilation-Jet Fundamentals", H. B. Nottage, J. G. Slaby, and W. P. Gojsza; "The A.S.H.V.E. Environment Laboratory", Cyril Tasker, C. M. Humphreys, G. V. Parmelee, and L. F. Schutrum; "Gas is an Important Factor in the Thermal Conductivity of

Space Heating and Conditioning

Most Insulating Materials", F. B. Rowley, R. C. Jordan, C. E. Lund, and R. M. Lander; "Thermal Performance of Frame Walls", G. O. Handegord and N. B. Hutcheon; "Physiological Adjustments of Clothed Human Beings to Sudden Change in Environment—First Hot Moist and Later Comfortable Conditions", F. K. Hick, Tohru Inouye, R. W. Keeton, Nathaniel Glickman, and M. K. Fahnestock; "Warm-Air Perimeter Heating—Temperature Drop in Ducts Embedded in Concrete Floors", Pt. II, J. R. Jamieson, R. W. Roose, S. Konzo, and H. T. Gilkey and Pt. III. J. R. Jamieson, R. W. Roose, and S. Konzo; "Performance of a Warm-Air Radial-Feeder Perimeter Loop System in a Residence", M. E. Childs, R. W. Roose, and S. Konzo; "Experimental Data on Drying Atmospheric Air for a Supersonic Wind Tunnel", W. E. Emley, Jr.; "A Low-Inertia Low-Resistance Heat Flow Meter", R. G. Huebscher, L. F. Schutrum, and G. V. Parmelee; "Effectiveness and Temperature Requirements for Cooling Panels Removing Internal Radiation", Merl Baker; "Moisture Migration in a Closed Guarded Hot Plate", N. B. Hutcheon and J. A. Paxton; "Cooling Load From Sunlit Glass", C. O. Mackey and N. R. Gay; "A Study of a Transient Heat Method for Measuring Thermal Conductivity", D. D'Eustachio and R. E. Schreiner; "Outlet Turbulence Intensity as a Factor in Isothermal-Jet Flow", H. B. Nottage, J. G. Slaby, and W. P. Gojsza; "The Shading of Sunlit Glass—An Analysis of the Effect of Uniformly Spaced Flat Opaque Slats", G. V. Parmelee and W. W. Aubele; and "A Smoke-Filament Technique for Experimental Research in Room Air Distribution", H. B. Nottage, J. G. Slaby, and W. P. Gojsza.

10462 The Operating Cost of Residential Cooling Equipment. S. F. Gilman, L. A. Hall, and E. P. Palmatier. *Heating, Piping & Air Conditioning*, v. 26, Apr. 1954, p. 109-115.

Methods developed and confirmed by test results from 11 normal residences in six cities. Photographs, tables, graphs. 13 ref.

10463 Field Studies of Floor Panel Control Systems. II. A. B. Algren, E. F. Snyder, Jr., and R. R. Head. *Heating, Piping & Air Conditioning*, v. 26, Apr. 1954, p. 117-127; disc., p. 127.

Field tests covered various control systems in three different types of construction. Diagrams, graphs, table.

10464 Heat-Loss Graph Aids in Specifying Most Economical Insulation Thickness. *Industrial Heating*, v. 21, Mar. 1954, p. 563-564, 566.

Application to mineral wool blanket insulation without requiring reference tables or repeated calculations. Table, graph.

10465 Sterilizing Germ-Contaminated Air by Direct Heating. Berton M. Sharpe. *Industrial Heating*, v. 21, Apr. 1954, p. 745 + 4 pages.

Sterilizing germ-contaminated air exhausted from a pharmacology laboratory is efficiently carried out with a package unit gas-fired direct air heater of the type commonly used for a wide variety of industrial heating processes. Photographs, diagrams, chart.

10466* Utilization of Solar Energy. Present State and Future Prospects. (French.) Félix Trombe. *Journal des recherches du centre national de la recherche scientifique*, 1953, no. 25, Dec., p. 193-215 + 3 plates.

Natural and artificial uses. Modern solar heating installation of Mont-Louis in the Pyrenees mountains. Photographs, diagrams, graphs. 37 ref.

10467* Investigation of Heat Conductivity of Freon-22. (Russian.) L. Cherneeva. *Kholodil'naia Tekhnika*, 1953, no. 3, July-Sept., p. 60-63.

Results of heated wire method. Comparison shows proposed formula conforms to experimental data. Diagrams, graphs, tables. 3 ref.

10468* Sizing Earth Heat Pumps. E. B. Penrod. *Refrigerating Engineering*, v. 62, Apr. 1954, p. 57-61, 108, 112.

Method of Ingersoll and Plass determines length and depth of ground pipe. Illustrated for three different latitudes. Graphs, tables. 13 ref.

See also:
9488 (selection of motors for refrigeration)

TEXTILES AND FIBERS

10469* Symposium on Glass Fiber Textiles. Introduction. J. K. Park. *American Association for Textile Technology, Papers*, v. 9, Mar. 1954, p. 85-93; disc., p. 94-96.

Includes "The Chemical Structure of Glass Fibers & Its Effect on Properties", Alfred Marzocchi; "The Dyeing, Finishing & Printing of Glass Decorative Fabrics", R. F. Caroselli; and "Vinyl Coated Fiberglas Yarn. A New Basic Textile", Richard C. Horton.

10470* Dyeing Wool Bends and Other Fibers for Carpets. Harry F. Clapham. *American Dyestuff Reporter*, v. 43, Mar. 1, 1954, p. P141-P142.

Past and present dyeing methods. 1 ref.

10471* New Neutral-Dyeing Metalized Wool Colors. H. F. Clapham. *American Dyestuff Reporter*, v. 43, Mar. 29, 1954, p. P200-P202, P208.

Experimental study of dye properties. Table, graphs.

10472* Practical Partial Acetylation of Cotton. Edmund M. Buras, Jr., Albert S. Cooper, Esmond J. Keating, and Charles F. Goldthwait. *American Dyestuff Reporter*, v. 43, Mar. 29, 1954, p. P203-P207, disc., p. P207-P208.

Materials, equipment, and techniques of process. Diagrams, tables, graphs. 12 ref.

10473 The Aggregation Tendencies of Acid Wool Dyes in Saline Solutions. K. N. Davies and J. Whetstone. *Chemical Society, Journal*, 1954, Mar., p. 865-866.

Salting-out from aqueous solution of acid dyes by ammonium nitrate. Table, graph.

10474* Man-Made Fiber Data Sheets. III. Casein Fibers: Fibrolane, Merinova, Caslen. Paul A. Koch. *Modern Textiles Magazine*, v. 35, Apr. 1954, p. 71 + 4 pages. (Translated from *Zeitschrift für die gesamte Textilindustrie*, v. 55, p. 1310-1316.)

Definition, production designation, process developments, starting materials, manufacturing methods, chemical composition, properties, and applications. Tables, micrograph, diagrams. 72 ref.

10475* Pressure Dyeing and Bleaching With Special Reference to Recent Development. F. H. Marsh. *Society of Dyers and Colourists, Journal*, v. 70, Mar. 1954, p. 105-112 + 1 plate.

Materials, equipment, and techniques. Photographs, drawing. 3 ref.

10476* A Theory of Drafting and Its Practical Applications. P. F. Grishin. *Textile Institute, Journal, Transactions*, v. 45, Mar. 1954, p. T167-T266.

Surveys existing theories. Reference is made to Vasilieff's theory; analysis and synthesis of drafting process; and practical application. Tables, diagrams, graphs. 34 ref.

10477* Abrasion Damage of Textile Fibers. George Susich. *Textile Research Journal*, v. 24, Mar. 1954, p. 210-228.

Inherent abrasion behavior of 14 different textile yarn materials. Photographs, tables, graphs, diagrams. 18 ref.

10478* Velocity of Sorption of Phenols by Polyamide Fibers. (Russian.) A. B. Pakshver and E. K. Mankash. *Zhurnal Prikladnoi Khimii*, v. 27, no. 2, Feb. 1954, p. 182-188.

Diffusion velocity measurements. Tables, graphs. 4 ref.

Books and Miscellaneous Publications

10479 Equipment for the Processing of Long Vegetable Fibers. A. Aten, A. D. Faunce, and Luther R. Ray. 57 p. 1953. Food and Agriculture Organization of the United Nations, Rome. (TS1705 At27e)

Equipment and procedures for decortication, rippling, retting, crushing, scutching, hackling, and degumming.

See also:
10428 (synthetic fibers)

WELDING AND JOINING

10480* The Use of Preservatives for Animal Glues. D. Fysh. *Adhesives & Resins*, v. 2, Feb. 1954, p. 30-34.

10481 Fusion Welding Titanium. Francis H. Stevenson. *Aero Digest*, v. 68, Apr. 1954, p. 60, 62, 64.

Successful welding with tensile strength range from 70,000 to 100,000 psi. and a minium 15% elongation in two in. gage length. Welds made by inert-gas shielded W-arc process with and without filler materials. Photographs, tables.

10482* Results of Research on Sulfur Jointing Compounds. Raymond B. Seymour, Walter R. Pascoe, and Robert H. Steiner. *American Water Works Association, Journal*, v. 46, Mar. 1954, p. 237-245; disc., p. 245-248.

Plasticized S cements have sufficient strength and ductility to justify their use as jointing materials for bell-and-spigot cast-iron water mains. Photographs, tables. 21 ref.

10483* Institute of Welding. *British Welding Journal*, v. 1, Feb. 1954, p. 53-70.

Includes "Nitrogen-Arc Welding of Copper", E. Davis and C. A. Terry; "Spot Welding of Low-Alloy High-Tensile Steels", P. Joumat; "Reports of I.I.W. Commissions 4, 6, 9, and 13", L. Blosset, F. M. L. van Horenbeeck, H. G. Geerlings, and H. de Leiris; and "Testing Steels for Weldability", R. G. Braithwaite.

10484* British Welding Research Association. *British Welding Journal*, v. 1, Feb. 1954, p. 71-90.

Includes "Self-Adjusting Welding Arcs", J. C. Needham and G. Hull; "The Load-Deflection Relationship for a Partially Plastic Rolled-Steel Joist", J. W. Roderick; "Vanadium as Replacement for Molybdenum in Low-Alloy Steels", C. L. M. Cottrell and B. J. Bradstreet; and "Nitrogen-Arc Welding of Copper", K. Winterton.

10485 Investigations on Pressure Welding. R. F. Tylecote. *British Welding Journal*, v. 1, Mar. 1954, p. 117-135.

Principles of pressure or solid-phase welding. Relation between weldability of various metals at room temperature and physical properties of oxide film. Tables, diagrams, micrographs. 27 ref.

10486 Manufacture of Electrodes for the Arc Welding of Aluminum and Aluminum Alloys. L. V. Biryukova. *Henry Brutcher, Altadena, Calif., Translation no.* 3153, 3 p. (From *Avtogennoe Delo*, v. 24, no. 6, 1953, p. 25-26.)

Preparation of suitable coatings, composition, grinding, equipment needed, coating application, drying, storage of finished electrodes, and precautions to be taken.

10487 Mechanism of Ceramic-To-Metal Adherence. Adherence of Molybdenum to Alumina Ceramics. A. G. Pincus. *Ceramic Age*, v. 63, Mar. 1954, p. 16-20, 30-32.

Experimental evidence points to need for controlled amount of oxide of metal available at metal-ceramic interface. Micrographs, graph, diagram, table. 17 ref.

10488* Gluing of Metals in Aviation Structures. (French.) F. Vinsonneau and C. Thomas. *Docaéro*, 1954, no. 26, Mar., p. 15-24.

Reasons for use of cement in large structural parts. Equipment and use of Redux and Araldite type I cements. Photographs.

10489 The Pressure Welding of Molybdenum. A. R. Moss. *Institute of Metals, Journal*, v. 82, Apr. 1954, p. 374-378 + 4 plates.

Construction and use of controlled-atmosphere pressure-weld chamber. Micrographs, graphs.

10490* Rheology of Adhesives. I. (English.) D. Narayanamurti and B. K. Handa. *Kolloid-Zeitschrift*, v. 135, no. 3, Mar. 1954, p. 140-150.

Changes taking place in casein-sodium hydroxide and resorcinol formaldehyde adhesives. Graphs. 6 ref.

10490a Titanium Welding Procedures. *Light Metal Age*, v. 12, Apr. 1954, p. 15, 35.

Techniques of shielding weld and adjoining parent-metal sections from atmosphere while above 1400 F.

10491 Design Manual on Adhesives. *Machine Design*, v. 26, Apr. 1954, p. 144-174.

Types and choice of adhesives, bonding methods, and joint design. Photographs, tables, graphs, diagrams.

10492 Recent Developments in the Riveting of Aluminium. (English.) A. W. Brace. *Metallurgia*, v. 49, no. 292, Feb. 1954, p. 71-75.

Alloys suitable for use as rivets; design of pre-formed and driven heads. Tables, diagrams, graph, photographs. 11 ref.

10493 An Apparatus for Protection Against Dangerous Voltages in Welding Equipment. F. H. de Jong and D. W. van Rheenen. *Philips Technical Review*, v. 15, Jan. 1954, p. 199-204.

Based on principle of a voltage divider, which lowers voltage between welding rod and grounded work while no welding is taking place, but cuts out automatically as soon as welding is started. Graph, diagrams, photographs, oscillograms. 2 ref.

10494* "Colpitt" Welding Machines. (Dutch.) *Plastica*, v. 7, no. 3, Mar. 1954, p. 134-136.

Operation and capacity of various H.F. welding machines developed in Holland for welding plastics. Photographs.

10495 Progress in Plastics Sheet Welding. E. C. Stanley and H. R. Stilton. *Plastics*, v. 19, Mar. 1954, p. 72-75.

New applications of welding by R.F. current. Trends in design of welding equipment. Photographs, diagrams.

10496* Ceramic-Metal Seals of the Tungsten-Iron Type. D. G. Burnside. *RCA Review*, v. 15, Mar. 1954, p. 46-61.

Ceramic to be metallized is brush or spray coated with thin layer of mixed W and Fe powders and fired to a suitable temperature in a diluted reducing atmosphere. Photograph, diagrams, tables, graphs.

10496a* Noncorrosive Brazing With a Soldering Iron. (French.) *Revue de l'Aluminium*, v. 31, no. 208, Mar. 1954, p. 96-97.

Cd-Zn compound with melting point of 280 C easy to apply and useful for joining Al roofing. Photographs.

10497* Mechanical Riveting of Light Metals. (French.) B. Abaridi. *Revue de l'Aluminium*, v. 31, no. 208, Mar. 1954, p. 123-129.

Development and operation of hydraulic and oleo-pneumatic riveting machines. Diagrams, graphs, photographs, tables. (To be continued.)

10498* Electrical Resistance Welding of Aluminum. (German.) A. Müller-Busse. *Schweissen und Schneiden*, v. 6, no. 3, Mar. 1954, p. 93-102.

Principles, design and selection of machine circuits, and controls. Recommends acid treatment for preparing surface. Electrodes, welding data, and strength properties of the weld. Photographs, diagrams, graphs. 17 ref.

10499* Advances in the Field of Welding and Cutting. (German.) J. Ruge. *Schweissen und Schneiden*, v. 6, no. 3, Mar. 1954, p. 115-117.

Review of recent publications on electric-arc welding. 30 ref.

10500* Use and Structure of Basic-Lime Coated Electrodes. (German.) G. Zoethout. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 2, Feb. 1954, p. 58-61.

More C and Mn were retained but less O, N, and H were introduced. Graphs, photograph.

10501 Resistance Welding of Coated Mild-Steel Sheet. A. J. Hipperson. *Sheet Metal Industries*, v. 31, no. 323, Mar. 1954, p. 211-218.

Various welding problems caused by presence of coatings on mild steel. Recommends ways to obtain best results. Diagrams, tables, graphs. 5 ref.

Welding and Joining

10502 Automatic Arc and Resistance Welding as Applied to Sheet and Strip Metal. J. A. Dorrat. *Sheet Metal Industries,* v. 31, no. 324, Apr. 1954, p. 301-308, 310.

Automatic welding as applied to metallic, atomic-hydrogen, and argon arc welding. Resistance welding is also considered. Diagrams, tables, photographs. (To be concluded.)

10503* The Welding of Nickel and High Nickel Alloys. Lester F. Spencer. *Sheet Metal Worker,* v. 45, Mar. 1954, p. 71-72, 93.

Metallic, automatic-submerged, carbon, and inert-gas metallic arc welding. Table, photograph. (To be continued.)

10504* Glues and Gluing. XXXII. John E. Hyler. *Southern Lumberman,* v. 188, Mar. 15, 1954, p. 51-52, 54, 74.

Includes photographs, drawings.

10505* Joining Thin Walled Parts by Deforming With Rubber. Frank R. Simpson. *Tool Engineer,* v. 32, May 1954, p. 71-74.

Abstracted from ASTE paper 22T2. Equipment, procedures, limitations, and applications. Diagrams.

10506* Cold Welding of Cast Iron. (Russian.) Ia. Ia. Sineok, M. S. Baranov, L. A. Pankul, L. S. Sapiro, I. Z. Kagan, P. A. Glukhov, V. I. Mikhin, and A. S. Kirpichev. *Vestnik Mashinostroeniia,* v. 34, no. 2, Feb. 1954, p. 68-79.

Experiences of various authors on use of different electrodes. Advantages and disadvantages of the process. Diagrams, micrographs, photographs, table.

10507* Properties of Welded Joints Made With Basic and Neutral Electrode Coatings. (Russian.) Antonin Benesk. *Vestnik Mashinostroeniia,* v. 34, no. 2, Feb. 1954, p. 80-81.

Basic coatings permit improved vertical and overhead welding. Table, graphs.

10508* Production and Repair of Forge Dies by Electroweld Build-Up. (Russian.) P. I. Tabachnikov and P. P. Gol'man. *Vestnik Mashinostroeniia,* v. 34, no. 3, Mar. 1954, p. 54-57.

Preparation, chemical composition, and performance of electrodes. Diagrams, tables, micrographs.

10509* Automatic Arc Welding of Aluminum Alloys. (Russian.) A. A. Alov and G. D. Nikiforov. *Vestnik Mashinostroeniia,* v. 34, no. 3, Mar. 1954, p. 60-63.

Apparatus and methods showing advantages of simplicity, high productivity, low cost, and high quality welds. Photographs.

10510* Electro-Rivet Welding. (Russian.) S. I. Sobolev and N. E. Petukhov. *Vestnik Mashinostroeniia,* v. 34, no. 3, Mar. 1954, p. 66-69.

Method is simpler, less expensive, and more applicable than contact welding. Diagrams, photograph, table.

10511 Nickel-Lined Ship for Liquid Chemicals. Herman C. Phelps. *Welding Engineer,* v. 39, Apr. 1954, p. 41-44.

Welding and construction procedures; inspection methods; and performance expectations. Photographs, diagram.

10512 Are You Getting the Most From Your Electrode Dollar? M. O. Monsler. *Welding Engineer,* v. 39, Apr. 1954, p. 46-48, 53.

Stub losses, overwelding, poor fit-up, and welding out of flat position may be responsible for inefficiency. Charts, tables, diagrams.

10513 Multiple Electrode Welding by "Unionmelt" Process. D. E. Knight. *Welding Journal,* v. 33, Apr. 1954, p. 303-312.

Nomenclature and power supply in multiple-submerged arc welding. Advantages and applications of several types of connections. Diagrams, photographs.

10514 Resistance Spot Welding of Titanium and Its Alloys. A. J. Rosenberg. *Welding Journal,* v. 33, Apr. 1954, p. 324-328.

Properties of spot-welded joints in Ti and its alloys. Comparisons with spot-welded joints in other materials. Tables, photographs, graphs. 1 ref.

10515 Twinarc Submerged Arc Welding. Theodore Ashton. *Welding Journal,* v. 33, Apr. 1954, p. 350-355.

Use of two small diameter electrodes in place of one larger electrode in a single submerged-arc welding head. Diagram, photographs.

10516 D-C Welders—Rectifiers or Motor Generator Sets? S. Oestreicher. *Welding Journal,* v. 33, Apr. 1954, p. 356-360.

Compares static and dynamic performance characteristics. Photographs, diagrams, graphs, table, oscillograms.

10517 Carbon-Steel Electrodes for Use With Inert Gas Shields. Harry C. Cook and Gilbert R. Rothschild. *Welding Journal,* v. 33, Apr. 1954, p. 361-371.

Study of properties of weld deposits from an electrode for production use in welding of C steel by inert-gas-shielded metal-arc process. Use of fully killed steel electrode seems indicated. Tables, graphs, photographs.

10518 Low-Temperature Welding Alloys Speed and Simplify Structural Model Fabrication. Sidney Shore and Edward W. Rothfuss, Jr. *Welding Journal,* v. 33, Apr. 1954, p. 376-379.

Study of a model provides empirical data for designers of suspension bridge to determine adequacy of lateral bracing. Also effect of torsional loading upon the stiffness and stress distribution in the truss. Photographs, diagram.

10519 Effect of Atmospheric Contaminants on Arc Welds in Titanium. J. C. Barrett and I. R. Lane, Jr. *Welding Journal,* v. 33, Mar. 1954, p. 121S-128S.

Effect of O, N, H, and water vapor on physical properties of inert-gas-shielded W-arc Ti welds. Tables, graphs, photographs.

10520 Army First Pass Groove Weld Crack Susceptibility Test. Z. J. Fabrykowski, S. Goodman, and B. A. Schevo. *Welding Journal,* v. 33, Apr. 1954, p. 168S-172S.

Test is predicated on necessity of producing satisfactory crack-free first pass welds and bringing welding to scientific level. Diagrams, photographs, tables.

10521* High Temperature Brazing Shows Big Future for Bonding Jet Age Metals. George D. Cremer, Frank J. Filippi, and Richard S. Mueller. *Western Metals,* v. 12, Apr. 1954, p. 43-47.

Commercially available brazing alloys include Cu, Coast Metals, Ag-Mn, Mn-Ni, Pd-Ag, Pd-Ni, Solabraze, and Nicrobraz. Photographs, micrographs.

10522* Press Welding Experiments With Armco Iron at Temperatures Between 400 and 800 C. (German.) Helmut Held and Hans Hendus. *Zeitschrift für Metallkunde,* v. 45, no. 3, Mar. 1954, p. 112-116.

Dependence of joint strength on temperature in vacuum-welding process. Diagram, table, graphs. 12 ref.

10523* The Argomat. A New High-Duty Device for Protective-Gas Welding With Consumable Electrode. (French and German.) M. E. Witting. *Zeitschrift für Schweisstechnik,* v. 44, no. 3, Mar. 1954, p. 64-70.

Requirements and operation. Method well suited for welding Al, Cu, and stainless steel. Diagrams, photographs, table, graph.

10524* Weldable Malleable Iron "GF". (German and French.) Th. Walter. *Zeitschrift für Schweisstechnik,* v. 44, no. 4, Apr. 1954, p. 86-90.

Melted by a special process, this Fe is characterized by low Si and S content. Carbon content of weld joints is reduced by a special heat treatment.

Books and Miscellaneous Publications

10525 Welding Practice. E. Fuchs and H. Bradley, editors. v. I. Welding Methods and Tests. 130 p. 1951. v. II. Welding of Ferrous Metals. 198 p. 1952. v. III. Welding of Non-Ferrous Metals. 183 p. 1952. Butterworths Scientific Publications, London. (TS227 F95w)

Vol. I covers processes and applications; metallurgical considerations; examination and testing; equipment and shop lay-

out; and safety measures. Vol. II treats welding of plain C and alloy steels; cast iron; techniques for pressure vessels; and hard surfacing. Vol. III presents fundamentals of brazing and welding Cu, Al, Ni, and their alloys; Ag and Pb.

10526 Joining Magnesium. 126 p. 1953. Dow Chemical Co., Midland, Mich. (TN799.M2 D75j)

Welding methods; adhesive bonding; mechanical joining; brazing; soldering; protection of assemblies from corrosion.

10527 Simple Blueprint Reading With Special Reference to Welding. 207 p. 1953. Lincoln Electric Co., Cleveland. (TS379 L63s4)

Published as a service to the welding industry for educational purposes. Welding symbols as standardized by the AWS.

See also:
9186 (metal ceramic seals)
9217 (ultrasonic soldering)
9384 (epoxy cements)
9851 (practical design for welding)
9972 (cast-weld construction)
10078 (riveted and bolted joints)
10110 (welding stresses)
10120 (fracture strength of welds)
10286 (non-desructive testing of welds)
10286a (non-destructive testing of welds—book)
10288 (weld radiography)
10333 (statistics in welding design)
10338 (radiographs of welds)
10494 (welding of plastics)
10495 (welding of plastics)

WOOD AND FOREST PRODUCTS

10528* The Battle at the Tide Line. E. John Long. *American Forests*, v. 60, Feb. 1954, p. 8-11, 46-47.

Studies on control of marine borer. Photographs.

10529 ASTM Wood Pole Research Program. *ASTM Bulletin*, 1954, no. 197, p. 36-37.

Designed to replace existing inadequate and conflicting data with a solid basis of technical information for revised specifications. Photographs.

10530 Developments in Present Day Papermaking Machinery. W. J. Binns. *British Paper and Board Makers' Association, Proceedings of the Technical Section*, v. 34, pt. 2, June 1953, p. 205-217; disc., p. 218-226.

Developments on papermaking machinery and relations between these and faster operating speeds. Diagrams, table, graph.

10531 A Measurement of the Forces of Liquid Retention by Wet Papermaking Fibres. W. W. Barkas and R. Hallan. *British Paper and Board Makers' Association, Proceedings of the Technical Section*, v. 34, pt. 2, June 1953, p. 289-304; disc., p. 305-310.

Theory of capillary held water, applied to drying process. Tables, graphs, diagram. 16 ref.

10532 The Colouring of Paper Stock. B. J. R. Carey. *British Paper and Board Makers' Association, Proceedings of the Technical Section*, v. 34, pt. 2, June 1953, p. 311-322; disc., p. 323-328.

Survey of factors includes pigments and dyes used, addition sequences, use of toning colors, color nomenclature, effect of base furnish, method of making a match under practical conditions, and various aspects of color work in a laboratory. Table, diagrams.

10533 Waste Paper a Fibrous Raw Material. W. Brockie. *British Paper and Board Makers' Association, Proceedings of the Technical Section*, v. 34, pt. 3, Dec. 1953, p. 381-396; disc., p. 397-403.

Preparatory and cleaning methods for wastepaper stock. Losses caused by moisture and contraries in waste paper supplies. Tables, diagrams, graph. 3 ref.

10534 Slime Control With Phenyl Mercuric Acetate. H. G. Cook and J. N. Turner. *British Paper and Board Makers' Association, Proceedings of the Technical Section*, v. 34, pt. 3, Dec. 1953, p. 479-490; disc., p. 491-496.

Laboratory experiments were carried out to determine extent of retention on different pulps both sized and unsized. Details of chemical and biological analytical methods. Diagram, table. 6 ref.

10535 Wood Saponins. I. A Preliminary Investigation of the Saponins From Morabukea [*Mora gonggrijpii* (Kleinh.) Sandwith]. R. A. Laidlaw. *Chemical Society, Journal*, 1954, Feb., p. 752-757.

Products of acid hydrolysis.

10536* Physical Changes in Decaying Wood. D. B. Richards. *Journal of Forestry*, v. 52, Apr. 1954, p. 260-265.

Results of experimental studies. Tables, graphs. 15 ref.

10537 Relating Sawmill "Waste" to Log Quality. Fred C. Simmons. *Mechanical Engineering*, v. 76, Apr. 1954, p. 327-330.

What the small sawmill is doing to improve methods and minimize waste. Tables, photographs, graphs, diagrams.

10538* Progress in the Utilization of Spent Sulphite Liquor. W. M. Hearon. *Paper Mill News*, v. 77, Mar. 20, 1954, p. 70, 72, 74, 76.

What is now a liability may in the future become an asset which could change economics of sulfite pulp and paper manufacture. Tables. 38 ref.

10539* New Developments With Chlorine Dioxide Generation. L. A. Beaudry. *Paper Mill News*, v. 77, Mar. 20, 1954, p. 83-84, 115.

System developed for generation of ClO_2 that overcomes previous difficulties in continuous generation and use of this toxic, explosive, and corrosive agent. Diagram, photographs.

10540* The Continuous Manufacture of Semichemical Pulp for Corrugated Board. J. McK. Limerick. *Paper Mill News*, v. 77, Mar. 20, 1954, p. 86-87, 131.

Includes chipping, chip and chemical feeding, cooking, refining, washing, and board making. Diagram. 4 ref.

10541* Ammonia Versus Calcium in Acid Making, Cooking and Screening. L. A. LaFond. *Paper Mill News*, v. 77, Mar. 20, 1954, p. 90, 100.

Comparison in cost and operating experience is made with Ca or dolomite base-acid system.

10542* Manufacture of Hardboard in the United States. George G. Marra. *Paper Trade Journal*, v. 138, Apr. 2, 1954, p. 26, + 7 pages.

Status, development, and future trends. Classification based on types and methods of forming. 13 ref.

10543* The Chapman Printing Smoothness Tester. I. Basic Development and Recent Modifications. S. M. Chapman. **II. Instrument Variables and Some Results of Application.** G. R. Sears, J. A. Van den Akker, M. H. Aprison, N. J. Beckman, and C. W. Denzer. **III. Design and Use of a Direct Reading Tester.** D. Noel Obenshain. *Pulp and Paper*, v. 55, Mar. 1954, p. 89-116.

Includes diagrams, photographs, tables, graphs. 18 ref.

10544* Fibre Technology. I. Fibre Length Mensuration a Comprehensive History and New Method. J. W. Wilson. *Pulp and Paper Magazine of Canada*, v. 55, Apr. 1954, p. 84-91.

Development of fiber length measurement traced through microscopic methods, projection techniques, and mechanical evaluation. "Graduated Bull's-eye Target" presented as a rapid, inexpensive method. Table, diagram, photograph. 149 ref.

10545* Standard Testing Program of the Swiss Federal Materials Testing and Research Institute for Investigation of Wood Preservatives and Special Coatings for Wood. (German.) H. Kübne. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 3, Mar. 1954, p. 80-84.

Principle ideas and present version of program. Tables. 26 ref.

Wood and Forest Products

10546* The Application of Air to the Paper Industry. W. K. Metcalfe. *Southern Pulp and Paper Manufacturer,* v. 17, Apr. 1954, p. 58 + 10 pages.

Principles and importance of various applications. Chart, diagram, photographs.

10547* The Pulp and Paper Industry in the Far East. Roland A. Packard. *Tappi,* v. 37, Mar. 1954, p. 38 + 6 pages.

Progress in seven countries. Photographs, tables.

10548* Phase Contrast Microscopy of Beaten Pulp. G. Van Nederveen and J. Isings. *Tappi,* v. 37, Mar. 1954, p. 103-109.

Rag fibers (cotton and linen), softwood and hardwood sulfite, and straw pulp fibers. Micrographs. 3 ref.

10549* Modernization and Mechanization. Twin Keys to Wood's Future. Harold E. Holman. *Wood and Wood Products,* v. 59, May 1954, p. 26, 28, 46.

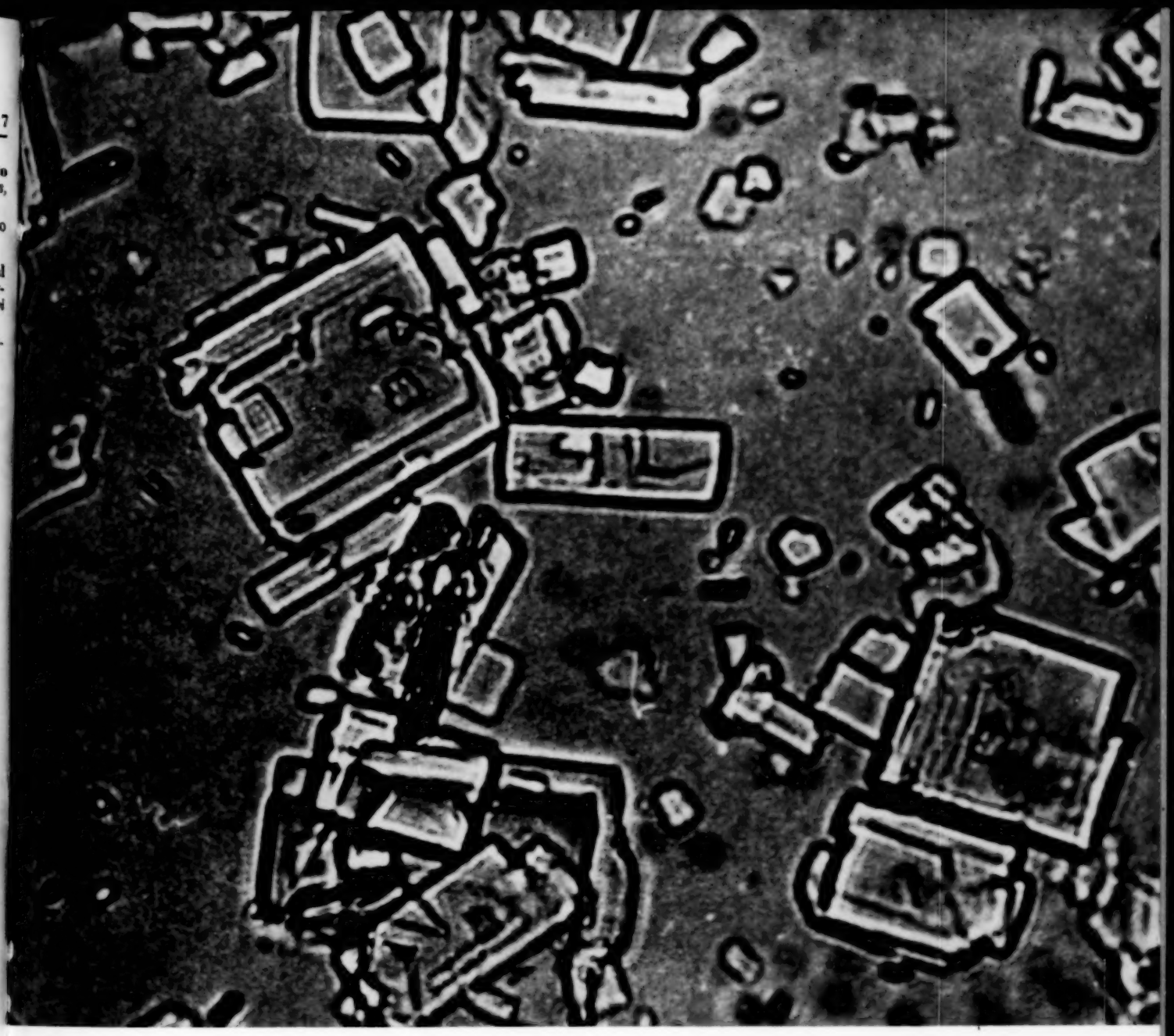
Proper equipment and economical methods hold the answer to stability of industry.

10550* Influence of Growth Conditions on Chemical Composition of Spruce Wood Pulps. (Russian.) V. I. Sharkov, V. A. Efimov, and V. S. Muromtseva. *Zhurnal Prikladnoi Khimii,* v. 27, no. 1, Jan. 1954, p. 92-96.

Content of mannose, methyl pentozan, and pentozan determined in various parts of conifier trunk. Tables. 1 ref.

See also:

9295 (natural dye woods)
9457 (corrosion in pulp digesters)
10504 (gluing of wood structures)



PROTEIN CRYSTALS

The forms pictured here are crystals of beta-lactoglobulin, a minor protein derived from milk. It was photographed at a magnification of 500 *x*. The largest of the crystals is only about one-third the width of a human hair. The photograph was made at the Battelle laboratories in Geneva, Switzerland.

BATTELLE MEMORIAL INSTITUTE was founded by the will of Gordon Battelle as a memorial to the Battelle family. The Battelles were among the first settlers of Ohio and were prominent in the development of the state's iron and steel industry.

Gordon Battelle, last of the family line, was impressed with the benefits to be derived from industrial research and left his estate for the building and endowment of an Institute "for the purpose of education . . . the encouragement of research . . . and the making of discoveries and inventions for industry." The Institute began operations in 1929.

As established, Battelle provides, on a not-for-profit basis, the physical plant, equipment, and personnel for conducting research. The great bulk of it is applied research conducted for industry and government.

In keeping with its educational function, the Institute also conducts fundamental or basic research. The results of much of this research are published to encourage science and industry and to benefit the public welfare.

FIELDS OF RESEARCH

CHEMICAL ENGINEERING — INDUSTRIAL PHYSICS — METALLURGY

CHEMISTRY — PLASTICS, RUBBER AND PAINTS

CERAMIC TECHNOLOGY — NUCLEONICS — WELDING TECHNOLOGY

GRAPHIC ARTS TECHNOLOGY — ELECTROCHEMISTRY

ENGINEERING ECONOMICS — ELECTRONICS — MINERAL PROCESSING

FUELS AND COMBUSTION — ELECTRICAL ENGINEERING

INFORMATION PROCESSING — BIOCHEMISTRY — OPERATIONS RESEARCH

MECHANICAL ENGINEERING — AGRICULTURAL SCIENCES

THEORETICAL AND APPLIED MECHANICS

Battelle Laboratories

505 King Avenue
Columbus 1, Ohio, U.S.A.

7 route de Drize, Carouge,
Geneva, Switzerland

Wiesbadnerstrasse
Frankfurt/Main, W 13, Germany

North Florida Research Station
Daytona Beach, Florida, U.S.A.

Offices

46 Bryanston Street
London, W 1, England

53, Avenue George V
Paris VIII, France

Suite 1124, Du Pont Circle Bldg.
1346 Connecticut Avenue
Washington 6, D. C., U.S.A.

Corso Matteotti 10
Milan, Italy

3, rue du Mont Blanc
Geneva, Switzerland

VOLUME 3, NUMBER 8 AUGUST 1954